Heating Piping & Air Conditioning

DESIGN
INSTALLATION
OPERATION
MAINTENANCE

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INDUSTRIAL
COMMERCIAL
INSTITUTIONAL AND
PUBLIC BUILDINGS

Page 157—Journal Section of the American Society of Heating and Ventilating Engineers

JANUARY

1950
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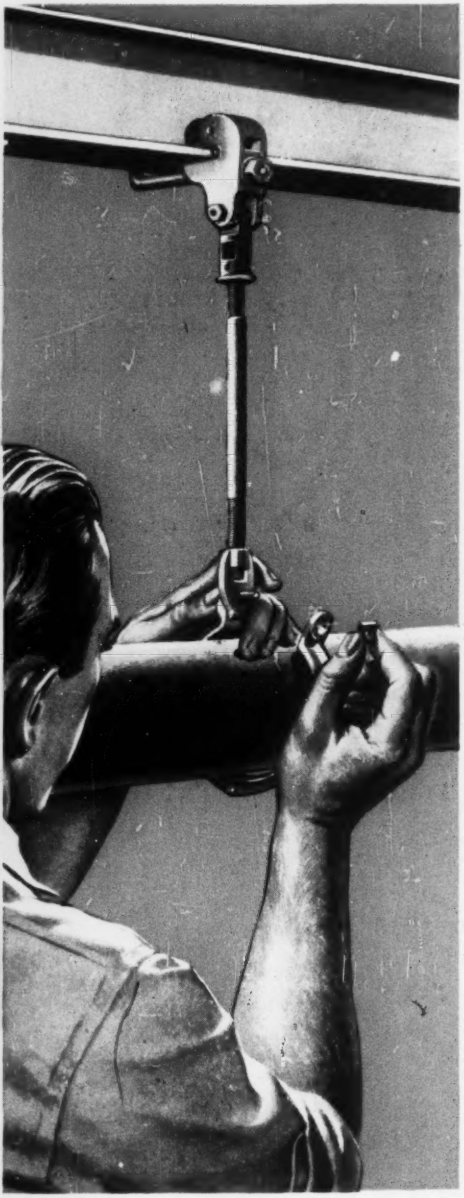
& SHOW
NUMBER



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MALLEABLE IRON EXTENSION PIECE (Fig. 157) . . . Bolts into Universal Side I-beam Clamp (Fig. 225) and other malleable iron clamps to receive hanger rod. Provides for adjustment of rod.

MALLEABLE IRON SPLIT PIPE RING AND SOCKET (Fig. 107R)...Once hanger rod is turned to proper adjustment and the attached half of the ring is snugged against the pipe, the other half of the ring is swung up into position and bolted. For 13 pipe sizes, ½" to 8", for loads from 75 to 1510 lbs.

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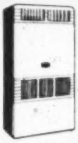
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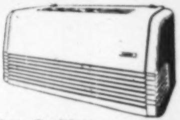
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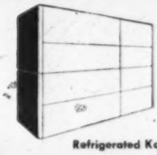
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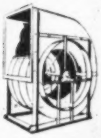
and manufacturers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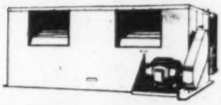
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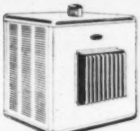
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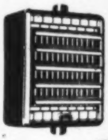
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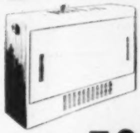
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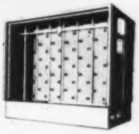
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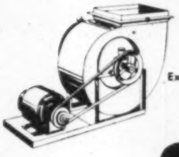
air conditioning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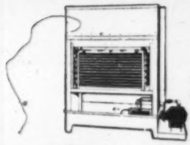
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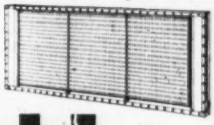
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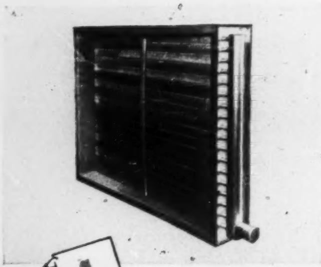

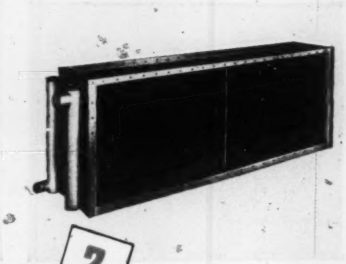

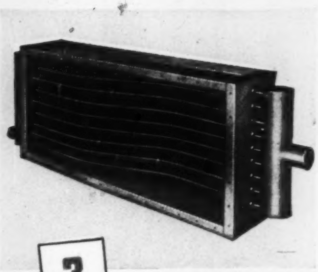

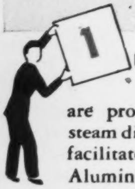

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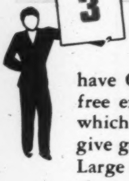

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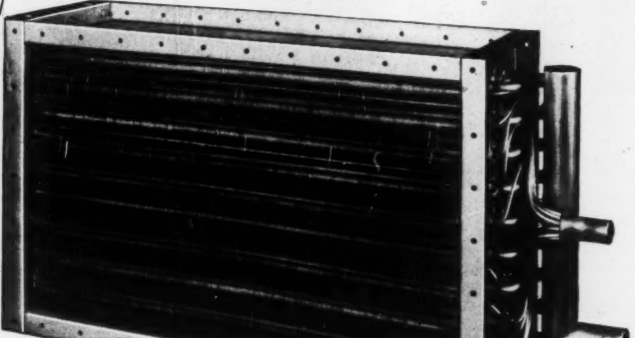

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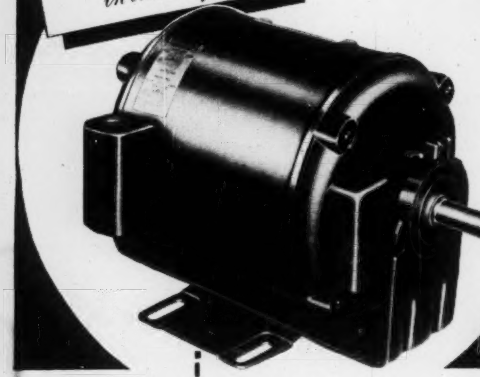
...The choice of leaders
in industry



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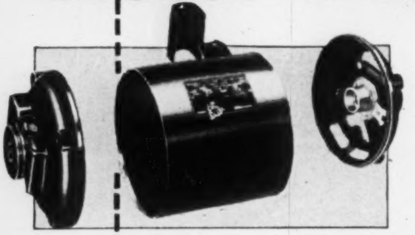

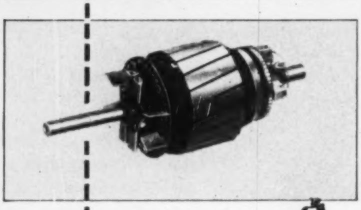

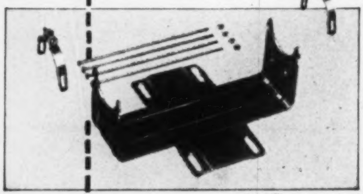

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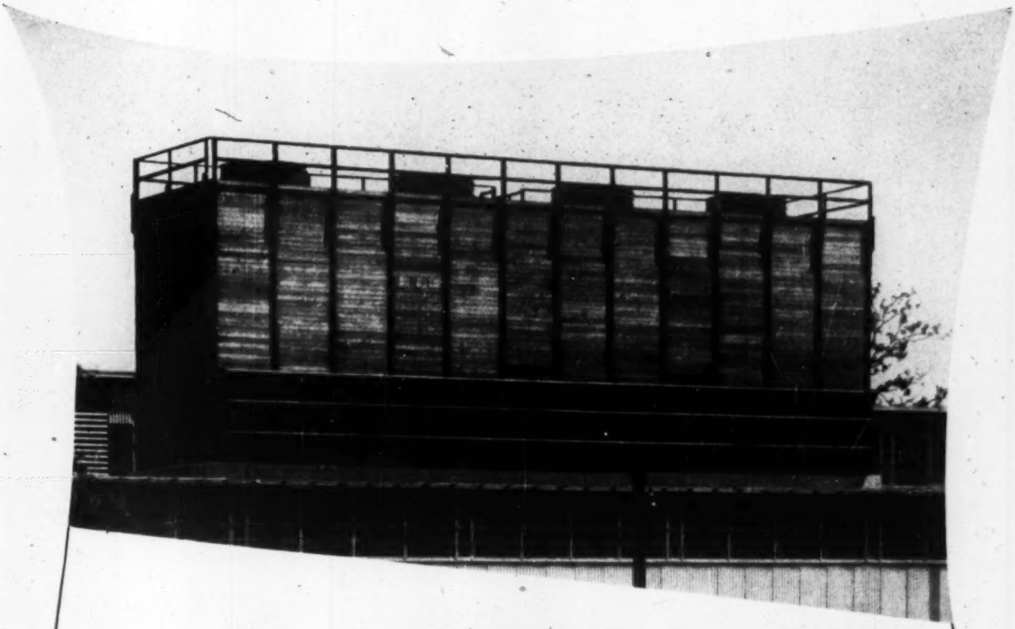

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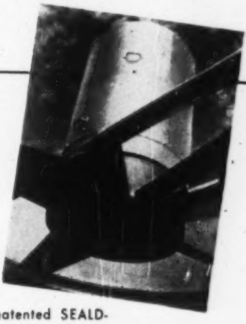

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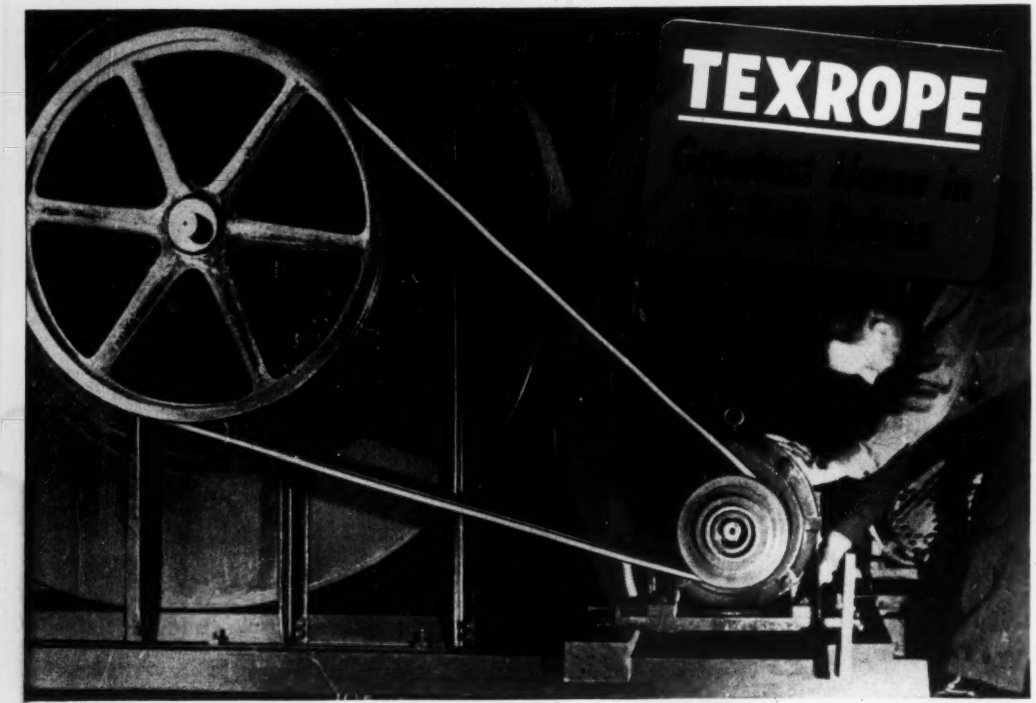

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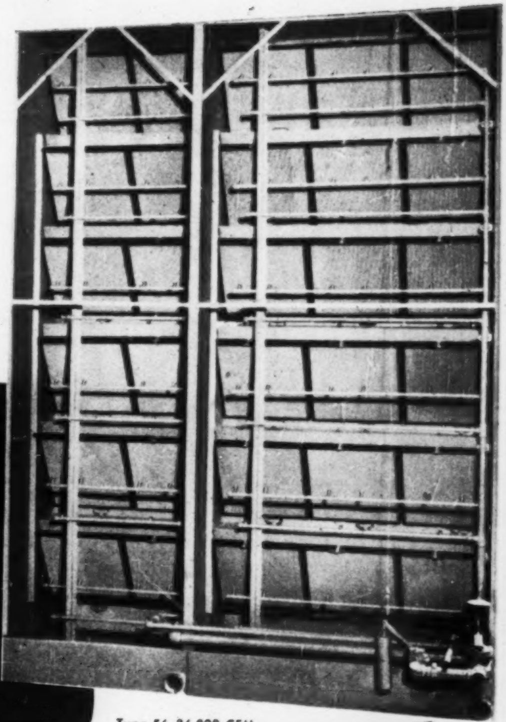

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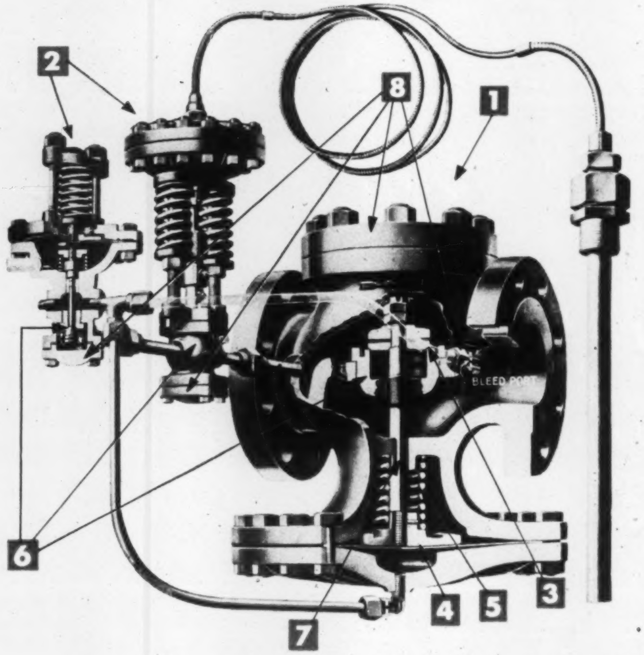


The cutaway illustration above shows why Spence Regulators . . .

REGULATE ACCURATELY

1 The single-seated *packless* main valve is actuated by a large balanced diaphragm. The construction eliminates the need for closely fitted parts which may stick or bind due to uneven expansion or foreign matter.

2 One or more sensitive pressure or temperature pilots control the main valve.

Because the Spence design minimizes friction, accurate regulation remains unaffected by changes in service conditions or length of service.

STAY ON THE JOB FOR YEARS

3 SECO Metal Seats and Discs resist wiredrawing. More than 20 years of experience with SECO Metal in thousands of installations has failed to produce one single case where SECO Metal has been cut by steam.

4 Spence metal diaphragms, under usual conditions, never require replacement. Spence Regulators have few moving parts and those few are ruggedly constructed and seldom require attention.

5 The spring in the Spence Regulator is out of the path of the fluid flowing through the valve. It operates at low unit stress to assure performance over an unusually long life.

REDUCE MAINTENANCE

6 The seat and disc of the main valve and pilot can be cleaned and any working part removed, without taking the main valve out of the line.

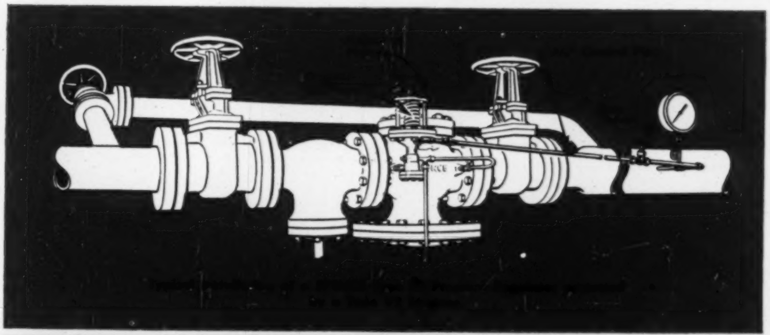
7 All main valves and most pilots are built without stuffing boxes. This packless construction eliminates much time-consuming maintenance.

8 No dismantling is necessary to inspect the main valve disc, the pilot valve member and the SECO Metal bleedport. Special openings are provided. Inspection is easier, too, because the pilot is not an integral part of the main valve.

SPENCE ENGINEERING COMPANY, INC.

AND TEMPERATURE CONTROL

TYPICAL INSTALLATIONS



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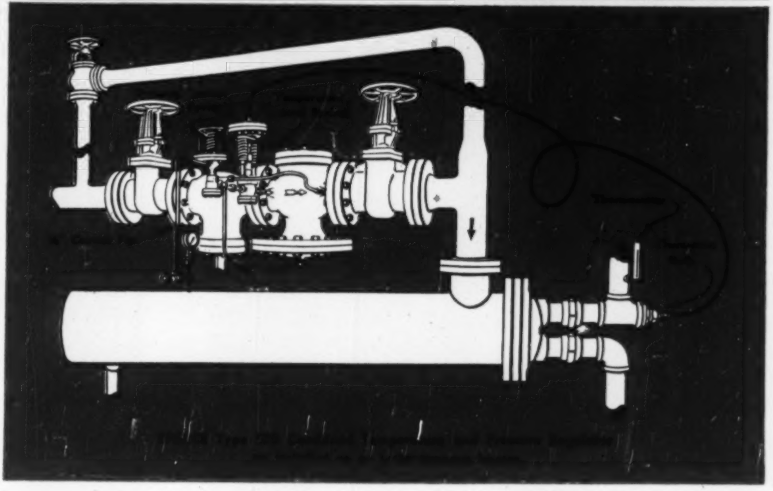

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HAVE UNUSUAL VERSATILITY

9 The Spence Regulator, due to its unique design, will serve many functions and will handle all the various types of fluids under a wide range of service conditions. One of the great advantages of this Spence design is the interchangeability of all pilots on all sizes of main valves. Any main valve can be changed from a pressure to a temperature regulator or vice versa *simply by substituting one type of pilot for another.*

Spence Regulators are built in sizes from 1/4" to 12" for service with air, steam, water, oil or gas. With minor adjustments, any Spence Regulator can be easily switched from one service to another.

FREE BULLETIN gives complete engineering details and selection data. It features a full color, fully illustrated description of the operating cycle of a Spence Regulator. Send for your copy of this valuable bulletin today.

9

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Type	Delivery Pressure Range, PSI	Normal Accuracy + or −
D	3-150	1 PSI
D5	1-25	½ PSI
W	0-10	¼ PSI
W7	0-3	½ OZ

LIST OF USERS

- Cleveland Cliffs Iron Company
- Tennessee Coal, Iron & Railroad Corp.
- Spring Cotton Mills
- Ford Motor Company
- Cochrane Corporation
- Philadelphia Electric Co.
- Pennsylvania Power and Light Corporation
- L. H. Gilmer Company
- York Corporation
- Jones & Laughlin Steel Corporation
- Duluth Steam Corporation
- Rochester Gas & Electric Company
- Consolidated Gas & Electric Company of Baltimore
- Phenix Natural Gas Company
- Cutter Laboratories

TYPICAL APPLICATIONS OF SPENCE REGULATING VALVES

- Auxiliary Steam Control
- Heating Systems
- Live Steam Make-up
- Steam Feed to Evaporators
- Steam Feed to Vacuum Pans
- Gas and Oil Fuel Control
- Steam Jacketed Kettles
- Drying Rolls and Cans
- Steam Heated Presses
- Back Pressure Control
- Bleed Steam Control
- Turbine By-pass Control
- Milk Preheaters
- Steam Atomizing Oil Burners
- Steam Pump Governors
- Hot Water Heaters
- Fuel Oil Heaters
- Altitude Control
- Condenser, Cooling Water Control

Spence

WALDEN, NEW YORK

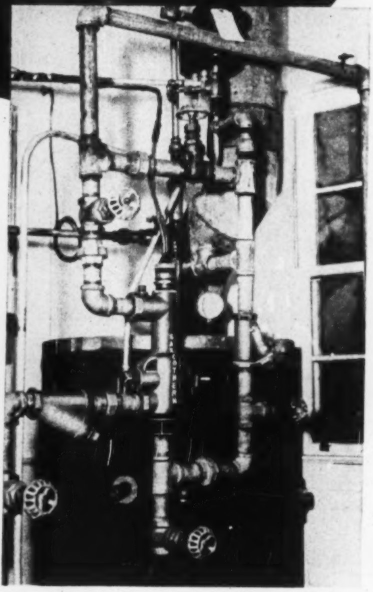
STORE
HOME
FACTORY
George W. Larsen

Wherever Comfort Counts-

SARCOTHERM

HOT WATER HEATING CONTROL

For an apartment or home, Sarcotherm is an inexpensive luxury, that is talked about among friends. In a store it provides that comfortable, expansive feeling that increases sales. And for office efficiency, there is nothing better according to users in industrial as well as commercial buildings.


Sarcotherm in a small home

NO "COLD SEVENTIES"

and no "on and off" control with Sarcotherm. It's a simple three way valve that mixes hot water from the boiler with the cooler return water.

ZONE CONTROL

Architects and Heating Engineers like Sarcotherm because it is so flexible. Zone control, split systems, set-backs and double switch lines are easily applied. Lower boiler temperatures, less fuel used and invariably a lower cost of installation, make Sarcotherm the ideal for engineers who are in daily competition.

RADIANT HEAT

Continuous circulation with modulated control is ideal. Inside control is by the exclusive Sarcotherm heat-loss thermostat. Thirty years of experience with Radiant Heating is built into every layout and every Sarcotherm.

INSIDE-OUTSIDE CONTROL

The Sarcotherm Control outside the building determines how warm the radiators should be on any particular hour of any day. Sarcotherm holds this temperature at all times, always with lower fuel costs, particularly in the Spring and Fall.

ASK FOR THE NEW CATALOG, ENGINEERING DATA AND SALES HELPS

Sarcotherm
FOR HOT WATER AND RADIANT HEATING

Sarcotherm

SARCOTHERM CONTROLS, INC. • Empire State Bldg. • NEW YORK 1, N. Y.

How to be Right the first time

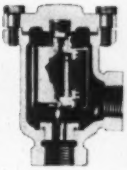
WHEN SELECTING STEAM TRAPS

No single type of trap is suitable for all applications. But one of the four distinct Sarco types will be exactly right for any given application. Some provide quicker warm ups in the morning, some extract more of the heat, some are better for fluctuating condensate loads and others are better for out of doors. Sarco has the only plant devoted exclusively to complete lines of steam traps and temperature controls. To be sure, the first time, see Sarco first.

A

THERMOSTATIC

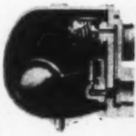
Wide open when cold for quick starts. Retains more of the heat before releasing condensate. Large valve orifice purges air quickly when starting. No seat changes when pressures change. Cannot freeze. Two types—for low pressure heating and high pressure industrial service up to 300 psi. Bulletin No. 250.



B

FLOAT

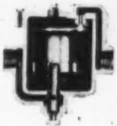
Ball float allows continuous discharge without shock to temperature controls and other instruments. Automatic thermostatic by-pass takes care of air and gases without steam waste. All pressures up to 200 psi. Bulletin No. 450.



C

BUCKET

Intermittent, but very rapid—can handle large volumes of condensate. Air goes out with the condensate. All parts attached to cover provide easy inspection. Straight-through connection makes installation easy. Integral strainer inside. Standard sizes to 250 psi. Forged steel types to 900 psi, and superheat. Bulletin No. 350.



D

LIQUID EXPANSION

A low cost combination of trapping and approximate temperature control. Ideal for outdoor tanks and lines and other points where condensate cannot be returned. In other forms, used as combination trap and control for wash tanks, food equipment, etc. Catalog Nos. 250 and 550.

APPLICATION	1st CHOICE	2nd CHOICE
Heating Main & Riser Drips, Low Pressure, large	B	B
Heating Main & Riser Drips, Low Pressure, small	B	A
Steam Mains to Engines, Turbines or Pumps	C	C
Steam Supply Lines to Process Equipment	A	C
Steam Lines Outdoors, small	A	D
Steam Lines Outdoors, large	C	A
Tracer Lines, Outdoors	A	D
Radiators & Wall Coils	A	B
Unit Heaters, large	B	C
Unit Heaters, small	B	A
Blast Coils & Stacks	B	C
Hot Water Heaters	B	C
Storage Tanks, outdoors	A	D
Storage Tanks, indoors	B	A
Track Heaters	D	A
Kettles & Pans, small	A	C
Kettles & Pans, large	B	C

Ask for Bulletin No. 1600 "Selecting Steam Traps"

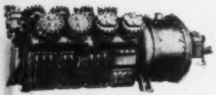
268

SARCO
SAVES STEAM

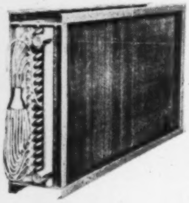
SARCO COMPANY, INC.
Represented in Principal Cities
Empire State Building, New York 1, N. Y.
SARCO CANADA, LTD., TORONTO 5, ONTARIO

IMPROVES PRODUCT QUALITY AND OUTPUT

READY!
THE ALL NEW--
STURTEVANT
AIR HANDLING UNIT
--STABLE
PERFORMANCE,
NEW FLEXIBILITY

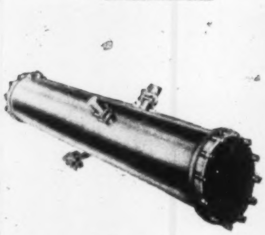

Refrigeration
Compressors

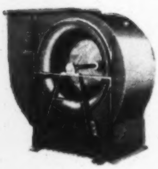
Axial Flow Fans

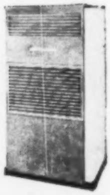

Heating and
Cooling Coils

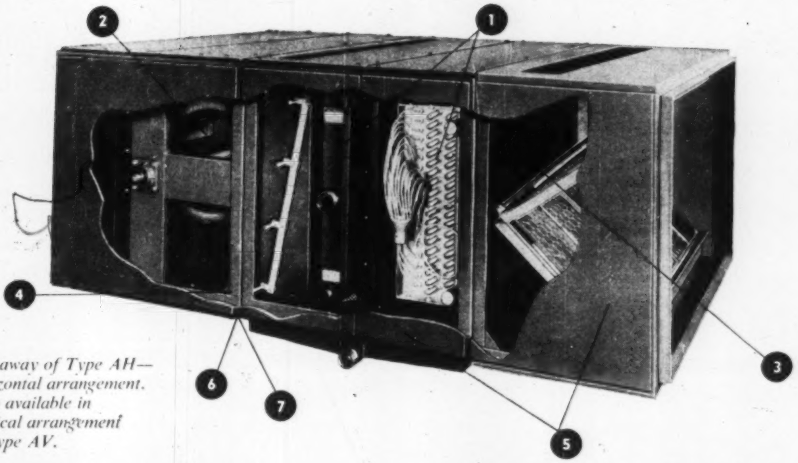
Everything
that puts air to
work for
Every application

J-80154


Refrigeration
Condensers


Centrifugal Fans


Unit Air
Conditioners



Cut-away of Type AH—horizontal arrangement. Also available in vertical arrangement —Type AV.

1. ALL TYPES OF COILS AVAILABLE
—for well water, chilled water or Freon, as well as hot water or steam—a complete line.

2. STABLE, QUIET FAN OPERATION
—with a revolutionary fan design. Non-overloading horsepower, steep stable pressure characteristic, certified performance.

3. MINIMUM INTERNAL RESISTANCE
—static pressure requirements kept low. Ample filter area, plate-type fins, eddy-free flow.

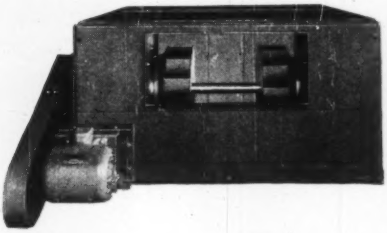
4. RUGGED, INSULATED CABINET
Sectionalized casing with welded, gussetted structural angle frames and insulated panels.

5. EXCELLENT MAINTENANCE ACCESSIBILITY
—wide, gasketed, hinged doors for easy filter removal. Fan and coil section panels removable.

6. FLEXIBLE DESIGN
—sectional construction permits wide variety of assembly arrangements and uses.

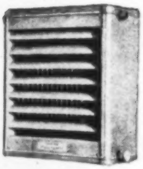
7. EASY TO ASSEMBLE AND INSTALL
—shipped in sections for ease of handling. Single outlet simplifies duct work.

8. UNDIVIDED RESPONSIBILITY
—fans, coils, motor . . . every *major part a product of* one *manufacturer. You can't get this vital, plus-value anywhere else!*

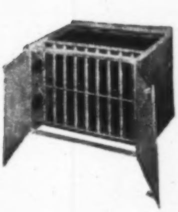


This announcement is important to you. For the complete story of these new units, including their selection and application, call your nearest Sturtevant office, or write Westinghouse Electric Corporation, Sturtevant Division, Hyde Park, Boston 36, Mass.

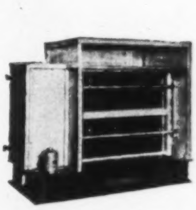
Westinghouse
Sturtevant Division



Unit Heaters



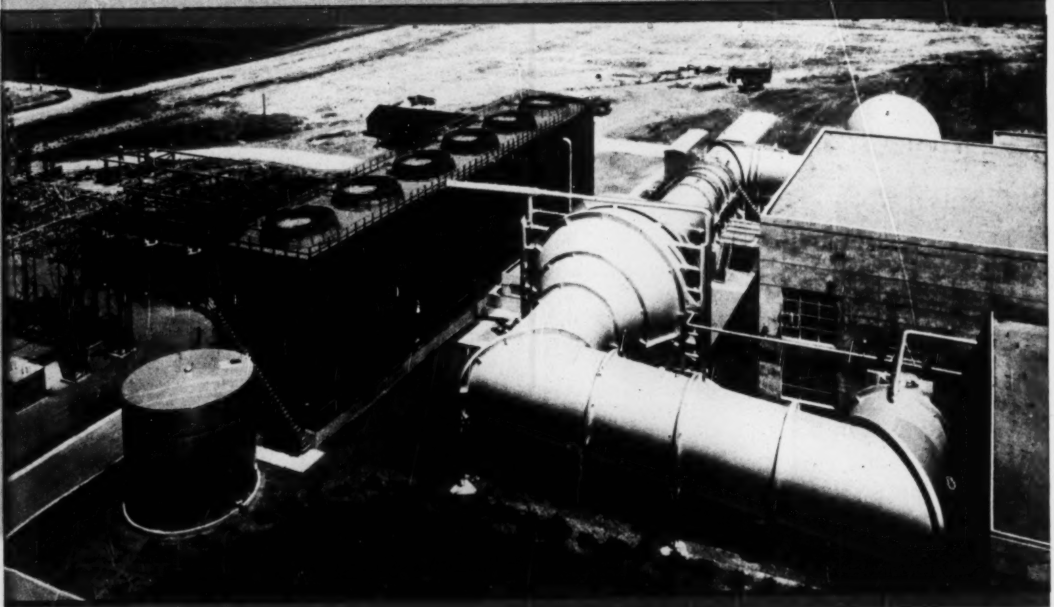
PRECIPITRON®
(Electronic Air Cleaner)

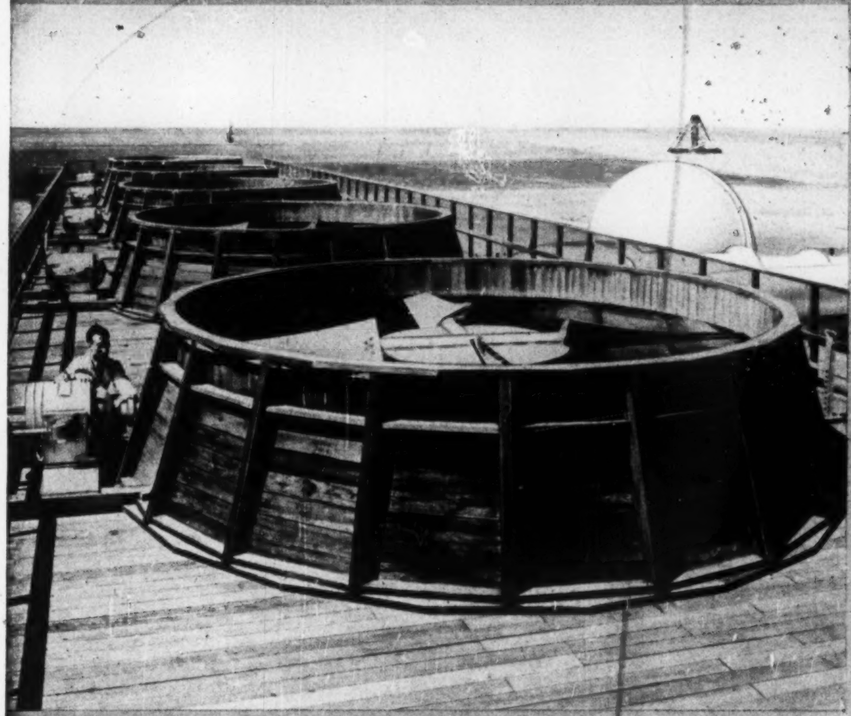


Surface Dehumidifiers

FOSTER WHEELER COOLING TOWERS

on many landscapes—in many climates





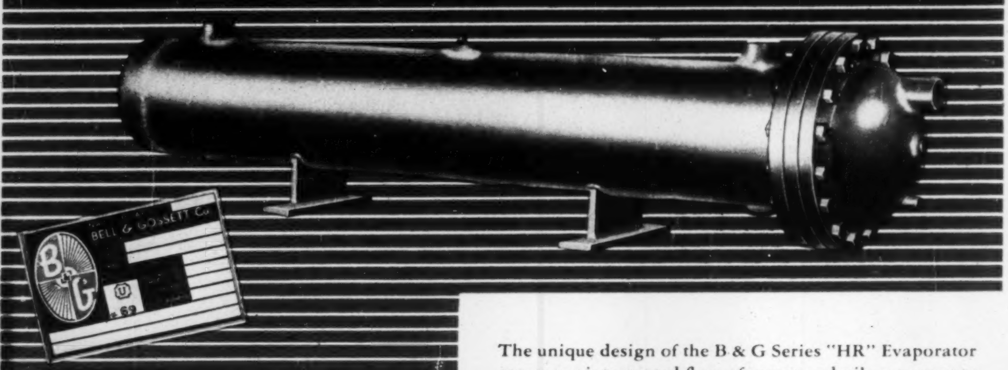
The cooling tower shown here serves the high speed engines operating the 6 by 6 foot supersonic wind tunnel of the NACA's Ames Aeronautical Laboratory at Moffet Field, California. It is an induced draft type of tower which was designed by Foster Wheeler engineers for high efficiency in cooling. The flexibility of this design, now standardized, enables Foster Wheeler to engineer and erect cooling towers for the requirements of any load anywhere in the world.

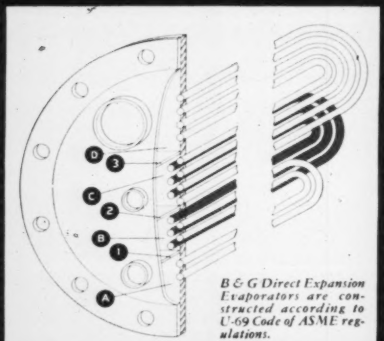
FOSTER WHEELER CORPORATION
165 Broadway • New York 6, New York

FOSTER WHEELER

Oil Traps Eliminated

BY NEW EVAPORATOR DESIGN





B & G Direct Expansion Evaporators are constructed according to U-69 Code of ASME regulations.

The unique design of the B & G Series "HR" Evaporator assures uninterrupted flow of vapor and oil—a warranty of more efficient and dependable performance.

A certain amount of compressor crankcase oil is picked up by the refrigerant during compression. If oil is continuously trapped in the evaporator, the oil in the compressor crankcase becomes depleted, which may cause bearing trouble. If the condition is not corrected, the system eventually becomes useless, for excessive oil in the evaporator reduces heat transfer.

The diagram at left shows how this trouble is prevented in the B & G Evaporator. Note that the lower tube in pass "B" leading to pass "C", and the lower tube in pass "C" leading to pass "D", is located very close to the baffle plate, permitting any oil entering passes to travel freely with the Freon vapor back to compressor. *There is no step-up or sump to trap oil!*

SEND FOR NEW CATALOGS

For complete engineering data on B & G Evaporators and Condensers write today for Catalogs BJ-848 and BK-948.

B&G
Hydro-Flo

SEE HOW B & G *HYDRO-FLO* PRODUCTS ARE MADE

You are cordially invited to visit the B & G plant—see the modern manufacturing methods which are making B & G *Hydro-Flo* Products known everywhere for the superior quality of their performance.

B & G

Hydro-Flo*

REFRIGERATION EQUIPMENT

BELL & GOSSETT COMPANY

Dept. RBH-5, Morton Grove, Ill.

*Reg. U. S. Pat. Off.

BUILT-IN LUBRICATION

keeps shafts running smoother, quieter, longer on Randall Pillow Blocks

You get *double* protection when you specify Randalls. *First*, these precision bearings have self-lubricating bushings, either graphited phosphor bronze or sintered bronze. *Second*, the self-aligning housings have big oil reservoirs, packed with SAE No. F-11 wool felt.

Even if lubrication is neglected, Randalls can roll along dependably for a long, long time.

The oil-saturated graphite or sintered metal continues to feed lubrication to the bearing surface, keeps the equipment running almost frictionless. The graphited bushings assure spectacularly longer service. The graphite alone will keep the shaft rolling quietly, long after the oil supply is completely exhausted.

These are the six basic pillow block types in the complete Randall Line. Sizes range from 1/2" through 3 15/16".

ONE-PIECE STEEL HOUSING PILLOW BLOCK

Double-lubricated, with graphited phosphor bronze bushing. Mounts in any position. For shafts 1 1/16" through 1 7/16"

SINTERED-BUSHING SERIES 148-248

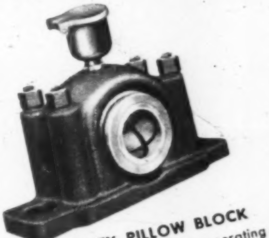
Sintered bronze bushing in Streamlined One-Piece Steel Housing. Mounts in any position. For shafts 5/8", 3/4", 15/16", and 1"

STREAMLINED ONE-PIECE STEEL HOUSING PILLOW BLOCK

Housing formed around self-aligning ball to permit maximum air flow. Double-lubricated, with graphited phosphor bronze bushing. Mounts in any position. For shafts 1/2" through 1"

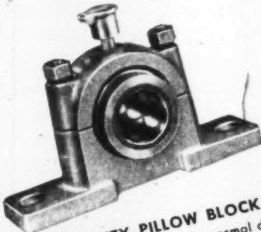
FLANGE or SIDE MOUNT PILLOW BLOCK

Built for the most exacting heavy duty service. Double lubricated, with graphited phosphor bronze bushing. This model is widely used in unit heaters, cabinet type air conditioning, and similar units. Side mounting only. For shafts 1/2" through 1 15/16"



HEAVY DUTY PILLOW BLOCK

Designed and built to meet severest operating conditions. Double lubricated, with graphited phosphor bronze bushing. Mounts in any position. For shafts 1/2" through 2 3/16"



NORMAL DUTY PILLOW BLOCK

A general service pillow block for normal duty on small shafts, for heavier service on larger shafts. Double lubricated, with graphited, phosphor bronze bushing. For shafts 1 1/4" through 3 15/16"

There's a Randall that's right for every air handling need . . . and you can afford the right Randall. Write for the complete story of Randall design and the Randall Line. Ask for Catalog 49

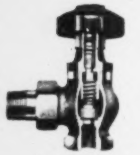
AT DALLAS . . . be sure to visit our display in Space 219

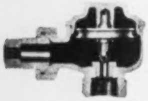
RANDALL GRAPHITE BEARINGS, INC.

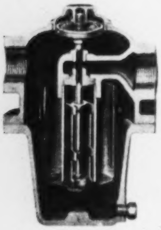
609 WEST LAKE STREET, DEPT. 110, CHICAGO 6, ILLINOIS

ILLINOIS *Heating System* CONTROLS

Type E Valve and Control Panel
Type A Valve and Control Panel


Series 48
Radiator Valve


Series G
Radiator Trap


Series G Float and
Thermostatic Trap

Illinois stresses the importance of control . . . not only for comfort and convenience . . . but fuel conservation as well. These control systems are offered in three types and each admits of modifications to meet special conditions. They are:

GENERATION Control . . . Type C

For independent boiler installations affording the maximum in fuel economy. Controls steam generation as well as steam circulation . . . a double economy.

CONTINUOUS FLOW Control . . . Types A and M

In installations which require zoned control, or where steam is used for other than heating and domestic hot water service, or where steam is supplied by Central Station Service, these systems are recommended. Illinois Flow Control Valves of the full floating type give complete and accurate regulation of steam flow. Furnished for pneumatic or manual operation, singly or in combination.

CYCLING FLOW Control . . . Type E

These systems have a wide range of application for automatic or manual control of steam flow and pressures not only in vacuum systems but in one-pipe or two-pipe gravity installations as well.

●

In addition to controls, ILLINOIS is also known from coast to coast for high efficiency standard vacuum and vapor systems. ILLINOIS specialties have the cumulative experience of 50 years built into them.

Write for bulletins

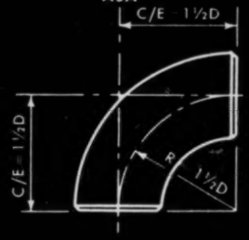
ILLINOIS ENGINEERING COMPANY
INCORPORATED 1900
RACINE AVENUE AT 21ST STREET • CHICAGO 8

Improvements and economies in welded piping result from this *Variety* of

MIDWEST ELBOWS

1

LONG RADIUS ASA



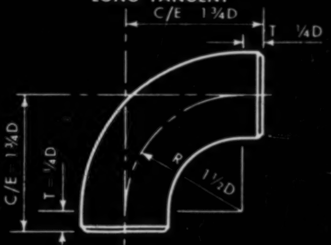
C/E 1½D
C/E = 1½D
R
1½D

SIZES: ¾" TO 24", INCLUSIVE

Dimensions conform to applicable size range of American Standard for Butt-Welding Fittings, ASA B16.9. Radius and center-to-end dimension equal 1½ times nominal pipe size.

2

LONG RADIUS LONG TANGENT



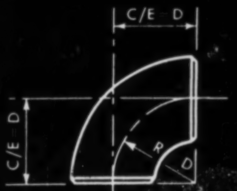
C/E 1¾D
T ¼D
C/E = 1¾D
T = ¼D
R
1½D

SIZES: 2" TO 20", INCLUSIVE

Same radius as ASA Elbows but with long integral tangent on each end — an exclusive Midwest feature that saves time and pipe. No price increase over ASA Elbows.

3

SHORT RADIUS

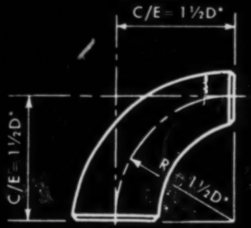


SIZES: 1" TO 30", INCLUSIVE

Where space limitations prevent use of ASA Elbows or Midwest "Long Tangent" Elbows shown above at right, these short turn elbows without tangents are recommended.

4

LONG RADIUS REDUCING



C/E = 1½D*
C/E = 1½D*
R
1½D*

SIZES: 2" TO 12"*, INCLUSIVE

Midwest Reducing Elbow takes the place of a straight elbow and a reducer. It saves more than one-third of the welding and improves both design and appearance.

SYMBOLS
C E — Center-to-End Dimension
T — Length of Tangent

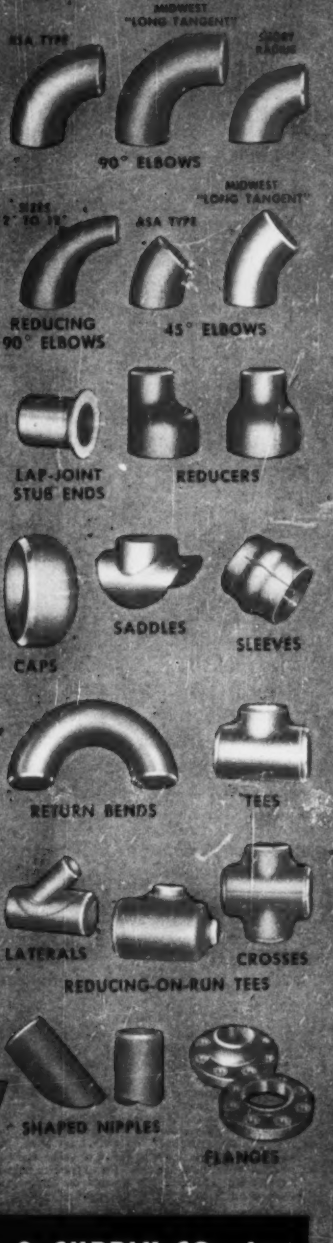
D — Nominal Pipe Size
R — Radius
*D — Dimension is for larger Pipe Size

The *variety* of Midwest Welding Elbows is particularly important because of the exceptional latitude in design and economy in erection that it provides. For example, the Midwest Long Tangent Elbow permits faster, easier, more accurate lining up with pipe . . . removes weld from point of maximum bending stress . . . often eliminates a short nipple and its extra weld. Slip-on flanges are easily used with minimum change in flange and fitting.

This "Variety" is only one of several reasons why many users prefer Midwest Welding Elbows.

Only MIDWEST offers this VARIETY

MIDWEST WELDING FITTINGS Improve Piping Designs and Reduce Costs



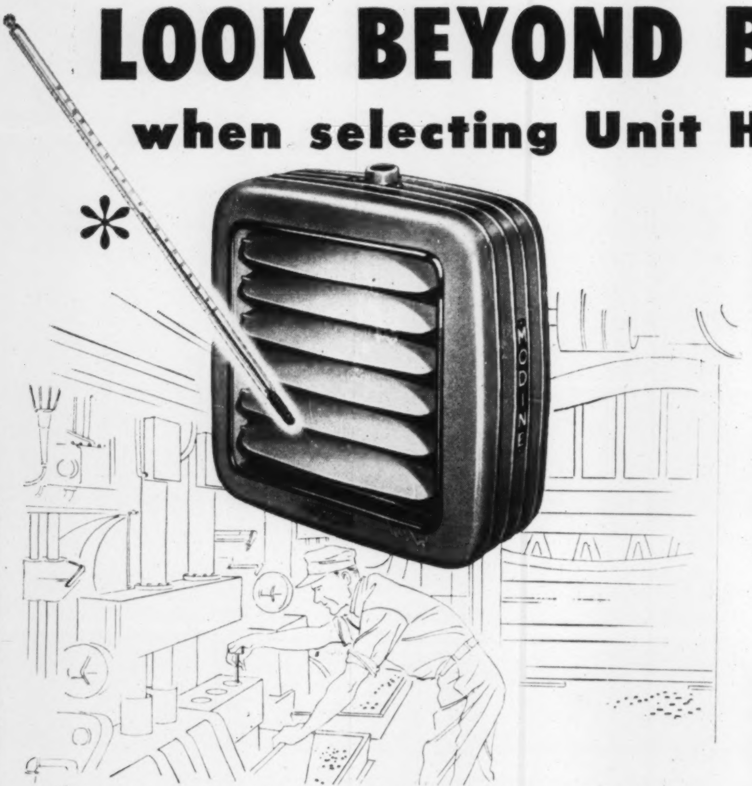
ASA TYPE
MIDWEST "LONG TANGENT"
SHORT RADIUS
90° ELBOWS
SIZES 2" TO 12"
ASA TYPE
MIDWEST "LONG TANGENT"
REDUCING 90° ELBOWS
45° ELBOWS
LAP-JOINT STUB ENDS
REDUCERS
CAPS
SADDLES
SLEEVES
RETURN BENDS
TEES
LATERALS
CROSSES
REDUCING-ON-RUN TEES
SHAPED NIPPLES
FLANGES

MIDWEST PIPING & SUPPLY CO., Inc.

Main Offices: 1450 South Second Street, St. Louis (4), Mo.
Sales Offices: New York (7), 30 Church St.
Chicago (3), 79 West Monroe St • Los Angeles (33), 520 Anderson St • Houston (2), 229 Shell Bldg • Tulsa (3), 533 Mayo Bldg
South Boston (27), 426 First St • Distributors in Principal Cities

LOOK BEYOND BTUs

when selecting Unit Heaters



* For maximum comfort and lowest operating cost, temperature of air leaving unit heater should be between 110 -120 F. at standard conditions.

Here's what you get with Modines!

• LOWER OPERATING COSTS

Modine Unit Heaters deliver heat down into comfort zones where heat is needed instead of wasting it on ceilings or above the heads of room occupants. *This means lower fuel costs!* Only unit heaters with sufficient air velocity and correctly related outlet temperatures can give you this performance.

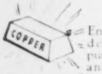
High quality split-phase or capacitor motors (instead of less expensive shaded-pole motors) are used on all but the smallest Modine Unit Heaters. *This means lower power and motor maintenance costs!*

• UNIFORM HEATING COMFORT

Overheated outlet air is buoyant and rises quickly. Underheated air feels "chilly." Similarly, excessive air velocity causes drafts, while air delivered with insufficient velocity fails to reach the floor.

Because Modine outlet temperatures and velocities are *right,* and correctly related to each other, hot blasts and cold drafts are avoided. Floors are kept comfortably warm. Heating is uniform in all parts of the room even in coldest weather.

WHY MODINES LAST LONGER



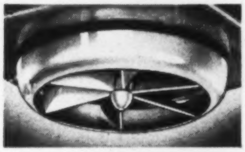
Entire condenser is pure copper and copper alloy . . . for maximum resistance to electrolysis and corrosion. Tubes are red brass; fins and headers, copper.

Differential expansion stresses are safely absorbed by bends in individual tubes and are not transmitted to tube-header joints to cause condenser fracture.

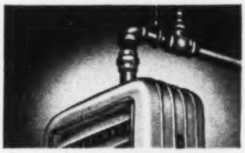
Fins are permanently bonded to tubes with metal. All condenser joints are brazed. There are no screwed or expanded joints to weaken condenser structure.

Parker-Bonderizing protects castings and sheet metal parts against formation and spread of rust. Anchors paint to steel. Prolongs original attractive finish.

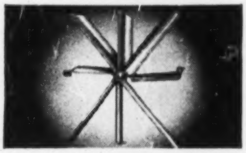
Modine quieter operation **is a result** of scientifically sound-silencing air rush noises. Motor vibrations are effectively absorbed and dissipated by rubber mountings and resilient motor suspension.



Control of heat distribution on vertical models is provided by a built-in adjustable radial deflector assembly, furnished at no extra cost. You can beam, flood or gently diffuse heat as required.



Direct-from-pipe suspension without other supports is safe and practical with Modine Horizontal models. This cuts installation costs and permits easy redirection of heat over a 360° range.



Built-in Velocity generator effectively increases heat throw without increasing power requirements. Outlet air retains a large share of its initial velocity to penetrate cold air strata near floor.

Get new Modine Unit Heater Bulletin today! Also available — "How To Evaluate Unit Heater Performance Characteristics." Your Modine Representative listed in Classified section of phone book. Or write Modine Mfg. Co., 1509 Dekoven Ave., Racine, Wis.

Modine UNIT HEATERS

U-1031

NO "FREEZE-UP"

with YARWAY TRAPS

Yarway Traps beat the worst weather in this installation at Thermoid's Trenton plant.

Troubled with outdoor steam traps freezing? Solve the problem the way Thermoid did at their Trenton, N. J., plant.

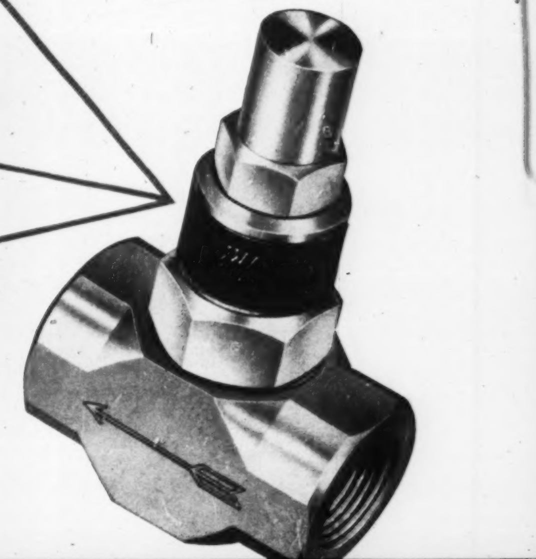
They installed Yarway Impulse Steam Traps on coal handling equipment. Now, though temperatures dip to zero and snows pile high, their traps never freeze.

Condensate does not accumulate in Yarway Impulse Traps. The only moving part—a little valve—floats on the load. It discharges condensate as it comes through, instead of waiting for a quantity to accumulate. Hence—nothing to freeze.

Add to that, Yarway Traps' reputation for low maintenance, quick heating, easy installation, and economy of operation and you have reasons why over 600,000 Yarways have already been bought.

Often it costs less to install new Yarways than to repair old type traps. See your nearest Mill Supply Dealer. For his name, and free Yarway Trap Book, write . . .

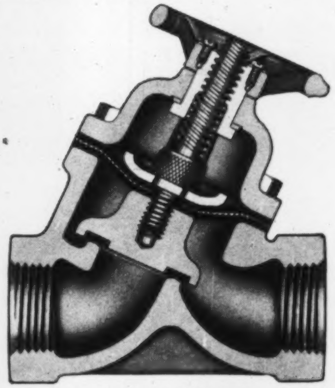
YARNALL-WARING COMPANY
107 Mermaid Avenue, Philadelphia 18, Pa.
Branch Offices in Principal Cities



See Yarway exhibit at Southwest Air Conditioning Exposition, Dallas, January 23-27, Booth 802

YARWAY **IMPULSE STEAM TRAP**

Piping equipment for every system... from one complete line



WORKING PRESSURES:
Up to 150 pounds water, oil, air or gas—180° F. max. temp. Sizes up to 6 in. Screwed or flanged ends.

FOR BETTER CONTROL OF HARD-TO-HOLD FLUIDS

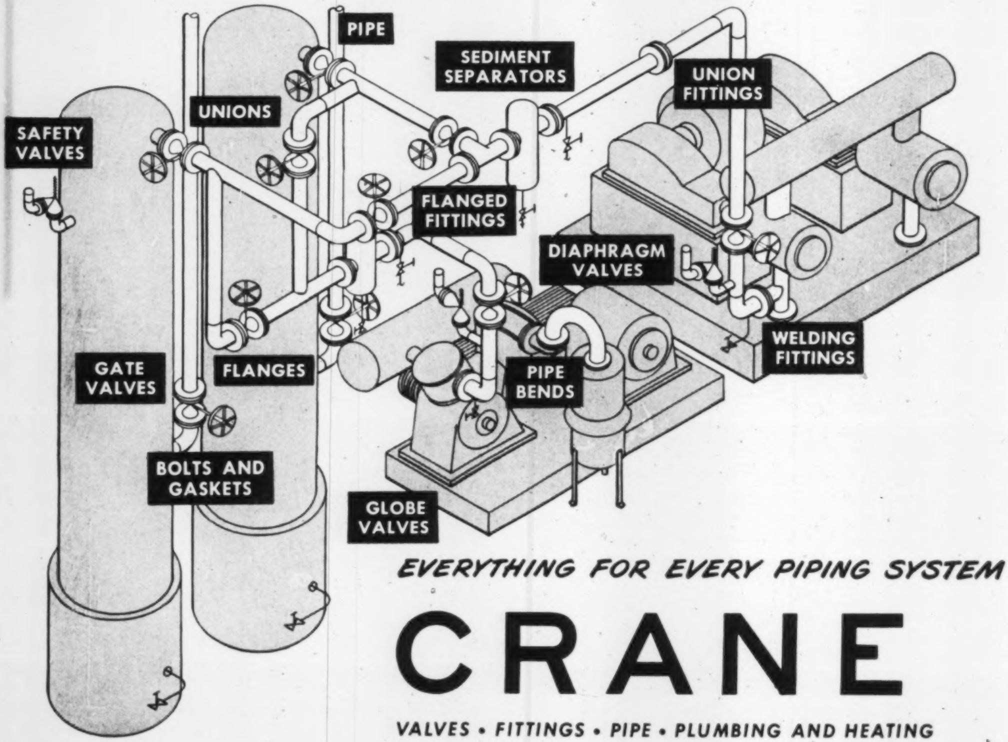
Crane Diaphragm Valves—in plain iron or Neoprene-lined types—are ideal for conveying compressed air, compressed or liquefied gases, volatile and corrosive fluids. Crane separate disc-diaphragm construction—a revolutionary improvement in packless valve design—makes these new valves safer, more durable, more efficient.

On Crane valves, the diaphragm is used only to seal the bonnet . . . is not subject to cutting, crushing and rapid wear. A separate circular disc permits positive shut-off even should the diaphragm fail. Y-pattern body design assures greater flow capacity, minimizes pressure drop. Crane separate disc-diaphragm design reduces appreciably the torque required to operate these valves. For further information, WRITE FOR CIRCULAR AD-1761.

CRANE CO., 836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas

diaphragm valves
CRANE

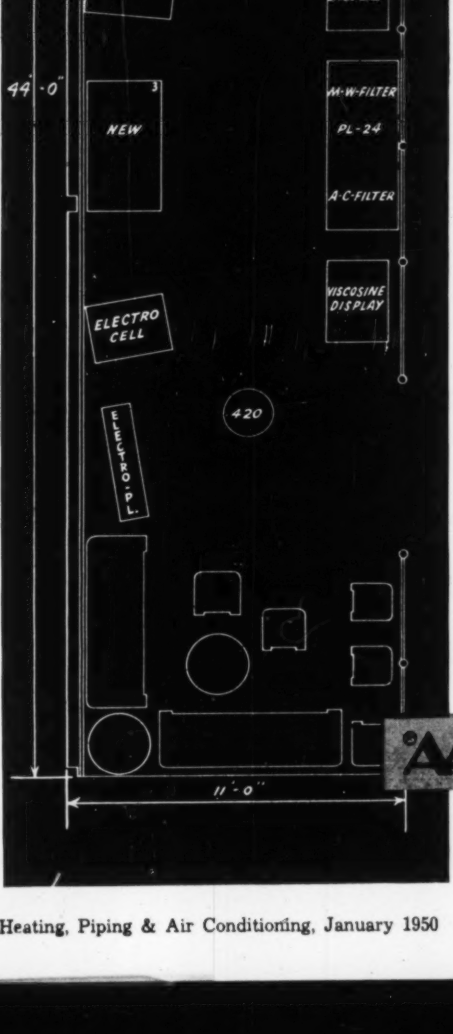
● ONE ORDER TO CRANE COVERS ALL PIPING NEEDS . . . FOR THIS AIR COMPRESSOR INSTALLATION, FOR EXAMPLE


PIPE
SEDIMENT SEPARATORS
UNION FITTINGS
UNIONS
SAFETY VALVES
FLANGED FITTINGS
DIAPHRAGM VALVES
WELDING FITTINGS
GATE VALVES
FLANGES
PIPE BENDS
BOLTS AND GASKETS
GLOBE VALVES

EVERYTHING FOR EVERY PIPING SYSTEM

CRANE

VALVES • FITTINGS • PIPE • PLUMBING AND HEATING


1
NEW
NEW
2
DEEP BED
MULTI-DUTY
416
ELECTRO-MATIC
MEDIA DISPLAY
44'-0"
3
NEW
M-W-FILTER
PL-24
A-C-FILTER
VISCOSINE DISPLAY
ELECTRO CELL
ELECTRO-PL.
420
11'-0"

What's New in American Air Filters?

6 IMPORTANT ANSWERS AWAIT YOU AT BOOTHS 416-420 IN DALLAS

3 NEW AAF FILTERS

(1) Auto-Airmat—A self-cleaning lint filter.

(2) Type LR—A low resistance unit filter for operating at high velocities.

(3) Amer-glas—A modern glass media Throway.

3 IMPROVED AAF FILTERS

(Old AAF favorites incorporating many new design and construction features that make for greater efficiency and ease of maintenance.)

+ . . . display of other AAF units which make up the only complete line of air filters engineered and manufactured under one name.

We'll be seeing you at the Southwest Air Conditioning Exposition, Dallas, Texas—Jan. 23-27.

AMERICAN AIR FILTER COMPANY, INC.
Louisville 8, Kentucky
In Canada: Darling Bros., Ltd., Montreal, P. Q.

AAF

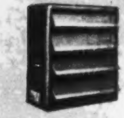
AIR FILTERS
AND ELECTRONIC PRECIPITATORS

BUILT RIGHT RUN RIGHT

Since 1889

61 *Years of Progress and Development*

nyb



Wherever air is handled mechanically, whether for ventilation, heating or process, the name New York Blower enjoys an enviable reputation. "*nyb*" on a product symbolizes perfected engineering, precision manufacture, Certified Ratings and a responsible guarantee of dependable performance.

In the early days of arc welding, this company was quick to adopt it in the manufacture of its products, and today specializes in the extensive use of heavy steel and welded construction.

As a charter member of the NAFM, this company has followed strictly the practice of having its products accurately tested and rated, both in its own laboratory and by disinterested outside engineers.

Today The New York Blower Company offers the facilities of its own completely equipped research laboratory, and a competent engineering staff to furnish engineering recommendations for both industrial and commercial air handling problems of every type.

The homespun phrase of 1889, "Built Right, Run Right," is *still* a good way to describe New York Blower products.

nyb

THE NEW YORK BLOWER COMPANY

GENERAL OFFICES • 32nd STREET & SHIELDS AVENUE • CHICAGO - 16
FACTORIES AT LAPORTE, INDIANA AND CHICAGO, ILLINOIS

PLAN *with* BALDOR

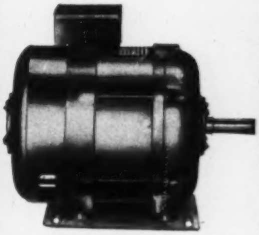
Your Engineering Staff PLUS Baldor Motor Specialists make a good strong team.

In planning new products and redesigning equipment, let the helpful cooperation of the Baldor Engineering Staff serve as a supplementary section of your own Engineering and Production Departments.

In our quarter-century of diversified motor-applications experience, we have probably solved — for other manufacturers — the very problems that now confront you on your drawing boards.

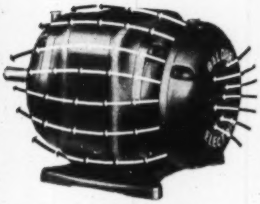
PLAN WITH BALDOR — the Better Motor for a Better Product.

BALDOR ELECTRIC COMPANY, 4353 Duncan Ave., ST. LOUIS 10, MO.
District Offices in Principal Cities



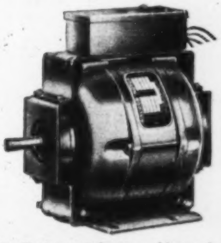
Open, drip-proof construction; 1/6 to 1/3 h.p., 1 phase, 3 phase and direct current.

Streamcooled, round frame, 1/3 to ¾ h.p., 1 phase, 3 phase and direct current.

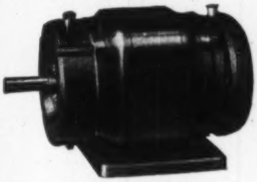


Streamcooled, polyphase, 1 to 20 h.p. (arrows indicate forced air cooling over entire exterior of motor frame).

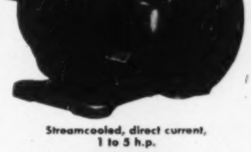
Streamcooled, single phase, ¾ to 7½ h.p.



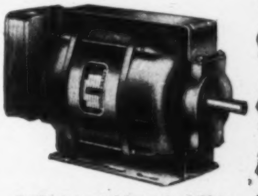
Resilient-mounted, open, drip-proof, for belt drive; 1/10 to ¾ h.p., single phase.



Streamcooled face mounted; 1 phase, 3 phase and direct current.

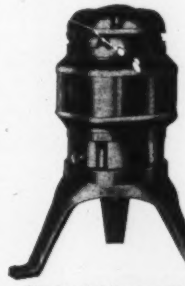


Streamcooled, direct current, 1 to 5 h.p.



Resilient-mounted fan motor 1/30 to ½ h.p., 1 phase; ⅛ to ½ h.p., 3 phase.

Baldor builds a complete line of bench and pedestal type Grinders, 6" to 12" wheels, ¼ to 3 h.p., including a special Carbide Tool Grinder.



Streamcooled, face-mounted with tripod; for vertical mounting.

Baldor
BETTER MOTORS
FOR MORE THAN A QUARTER OF A CENTURY

Yes, it's Youngstown!

Dependable Steel Pipe
The Pipe-Fitters Friend

FOR 45 years, Youngstown Steel Pipe has served plumbing and heating contractors dependably--enabling them to furnish adequate water and heating systems to customers at lowest cost.

Whether you use a few feet or thousands of miles of Youngstown Steel Pipe, you can depend on its uniformity--uniform in metallurgical and chemical properties for easy, accurate bending, cutting, welding and threading--uniform in diameter and roundness--cut to uniform lengths--uniformly smooth inside for minimum friction--in short, *uniformly satisfactory.*

QUALITY YOUNGSTOWN SERVICE

Youngstown
STEEL PIPE

THE YOUNGSTOWN SHEET AND TUBE COMPANY
Manufacturers of Carbon, Alloy and Yoloy Steel

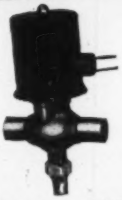
General Offices — Youngstown 1, Ohio
Export Office - 500 Fifth Avenue, New York

PIPE AND TUBULAR PRODUCTS - CONDUIT - BARS - RODS - COLD FINISHED CARBON AND ALLOY BARS - SHEETS - PLATES - WIRE - ELECTROLYTIC TIN PLATE - COKE TIN PLATE - RAILROAD TRACK SPIKES.

ALCO'S 25th ANNIVERSARY

Expansion valve, ¼-50 tons

Ammonia expansion valve, 1-100 tons


Solenoid, all refrigerants

EPR valves, all refrigerants

Our family has grown to more than 6,000 refrigerant controls.

ALCO has the *right* answer to every refrigerant control problem.
Write for detailed information on your intended use.
ALCO has refrigeration under control!

Designers and Manufacturers of Thermostatic Expansion Valves; Evaporator Pressure Regulators; Solenoid Valves; Float Valves; Float Switches.

SEE YOUR ALCO WHOLESALER

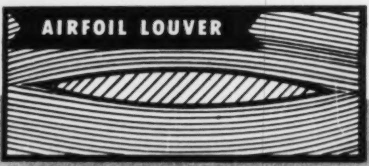
25 ALCO

ALCO VALVE CO.

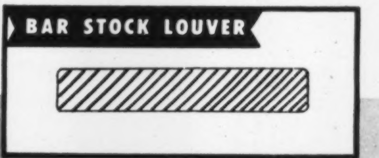
861 KINGSLAND AVE. • ST. LOUIS 5, MO.

4123

COMPARISON PROVES *Airfoil*



● **STREAMLINED, SMOOTH-AS-GLASS SOLID-SECTION AIRFOIL LOUVER knifes the air in wind tunnel tests. Note how turbulence has been almost completely eliminated. The AIRFOIL's clean lines give maximum control of air at all times.**



● **Line drawing shows blunt leading and trailing edges of louver. These set up immediate turbulence as air strikes. Are conducive to draft and noise. Do not give as satisfactory or smooth control of air.**

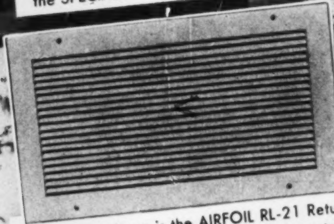
Airfoil

AIR CONDITIONING OUTLETS

FAR MORE EFFICIENT

Illustration shows Titus AIRFOIL Grilles specified for new John Hancock Building. Architects—Cram & Ferguson, Boston, Mass. General Contractors—Turner Construction Co., Boston, Mass. Heating and Ventilating Engineer—Buerkel & Co., Inc., Boston, Mass. Sheet Metal Contractors—Stanley E. Priggen Co., Boston, Mass.

Shown above is the AIRFOIL Model No. 270. It features two sets of AIRFOIL LOUVERS plus the SPECIAL DESIGN CONCEALED SUPPORT.

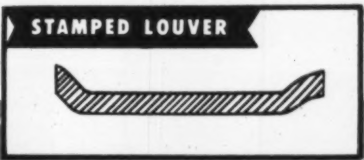


Illustrated above is the AIRFOIL RL-21 Return Air Grille. Features blades on ⅜ inch centers. The deep fins with easy curve deflection are standardized at 0° and 42°.

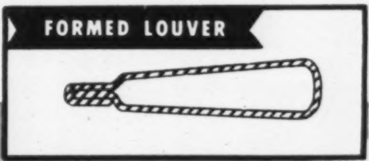
Illustrated above is the Titus AIRFOIL AG-25 Volume Controller. Controllers fit into duct behind grille. Insure an absolute, even and uniform distribution of air.

Authorized representatives in all principal cities.

GRILLES HAVE NO EQUAL



● Irregular shape of louver distorts air pattern creating unnecessary turbulence and noise. Note how this louver is not adaptable to flexible control of air.



● Formed edges are not smooth. Forming process does not allow smooth, solid surface. Crevices result which create turbulence and noise. Note hollow construction which may cause whistling sound.

FAR BETTER CONSTRUCTED

AIRFOIL Grilles feature the first really new idea in air conditioning outlet design. This is the STREAMLINED, SMOOTH-AS-GLASS AIRFOIL LOUVER. The louver is adapted from the Airfoil section of an airplane. It makes possible matchless air diffusion and distribution. AIRFOIL Grilles handle higher air velocities with MINIMUM TURBULENCE, MINIMUM NOISE and NEAR-PERFECT, DRAFT-FREE PERFORMANCE.

OUTPERFORMS

Enthusiastic contractors, architects, engineers—nation-wide—declare these new Titus AIRFOIL Grilles *outmode all others—outperform all others.* The solid-section blades—made of extruded material—are almost perfectly streamlined to give maximum control of air at all times. *This design handles air diffusion and distribution like no other grille ever has.*

INSTALLS EASIER

AIRFOIL Grilles are light, but extremely strong. EASIER TO CARRY—EASIER TO HANDLE—EASIER TO INSTALL. The lightness in weight means less fatigue for the worker. Louvers are invididually adjustable—made to turn easily. Clean easily with ABSOLUTELY NO FREEZING.

COSTS LESS

AIRFOIL Air Conditioning Outlets actually add value to any air conditioning system. Make it perform better—give an efficiency that is not available in any otherGrille at any price.

Contractors know they get MORE PERFORMANCE—MORE VALUE for LESS MONEY with Titus AIRFOIL Grilles.

THE *Airfoil* LINE IS COMPLETE

CHECK TYPE OF GRILLE ON WHICH INFORMATION IS DESIRED

- ☐ Air conditioning outlets
- ☐ Return air grilles
- ☐ Return air registers
- ☐ Volume controllers
- ☐ Ceiling outlets
- ☐ Perforated metal grilles
- ☐ Ornamental grilles
- ☐ Door ventilators
- ☐ Marine diffusers
- ☐ Industrial air distributors
- ☐ Floor registers
- ☐ Automatic back-pressure dampers
- ☐ Grilles for room air conditioners
- ☐ Special made-to-order grilles
- ☐ Installation frames and accessories
- ☐ High velocity factory outlets
- ☐ Toilet exhaust registers
- ☐ Plain lattice grilles
- ☐ Grilles for convector radiators

TITUS MANUFACTURING CORP.
Waterloo, Iowa

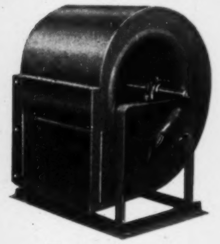
Gentlemen: Please rush me complete information including prices, discounts, and delivery on the amazing, new AIRFOIL Air Conditioning Outlets.

NAME____________________

ADDRESS____________________

CITY________________ STATE__________

Industrial
Process Fans



Furnace and
Unit Conditioner Fans

Extra Heavy

Construction . . .

Unicoil
Conditioning Units

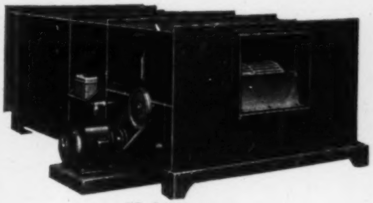
Ventilating
and Conditioning Fans

Air Washers
and Purifiers

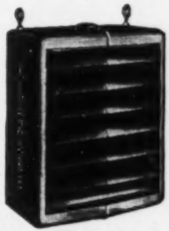
Choice of leading architects, engineers and contractors — for nearly 40 years.

SEE OUR CATALOG IN SWEET'S

Unitherm
Unit Heaters
with Syncrotherm Control



Multitherm
Conditioning Units



Clarco
Unit Heaters

. . . for

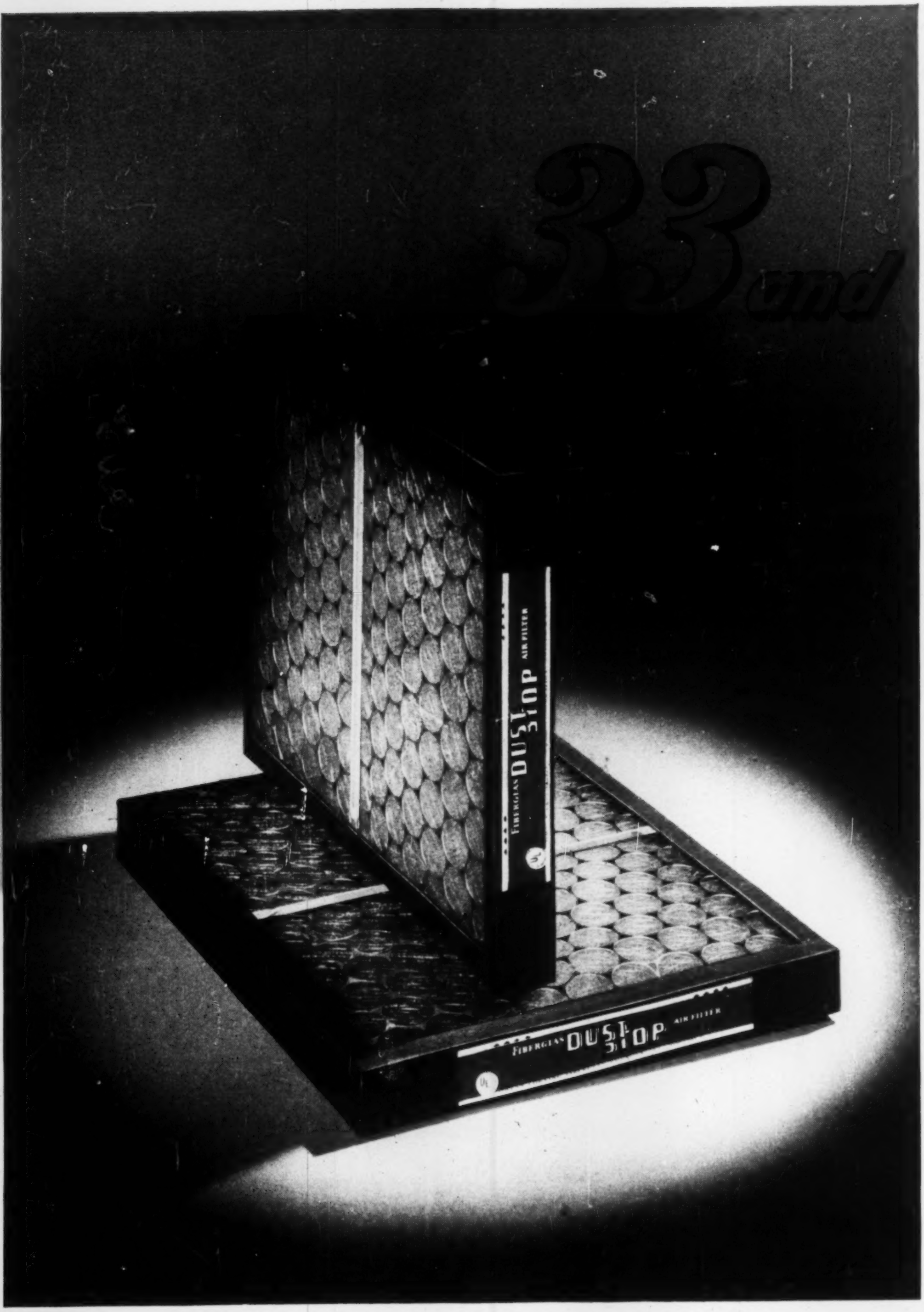
Extra Years of Service

No weaklings in the Clarage air handling and conditioning line! . . . Every unit we built is *fully equal* to the job it handles.

If faithful performance and operating economy are what you're after, we have the answer to your requirements. Your inquiry is invited. Try us!

An Industry Leader
in Research,
Engineering,
Manufacturing

CLARAGE FAN COMPANY
KALAMAZOO, MICHIGAN . . . *Application Engineering Offices in All Principal Cities*


33 and
FIBERGLAS DUST STOP AIR FILTER
FIBERGLAS DUST STOP AIR FILTER

UL now make the
BEST even BETTER

Presenting TWO Great New Features of the Original, Genuine

DUST STOP* **AIR FILTERS**

*T. M. REG. U. S. PAT. OFF.

33 **DUST-STOP*** Air Filters now have ONE-THIRD longer life with the same high efficiency as before.

UL **DUST-STOP** Air Filters are now listed by the well-known Underwriters' Laboratories, Inc.

For the detailed story behind these great money-saving improvements, see this magazine next month, or write to Owens-Corning Fiberglas Corporation, Toledo 1, Ohio.

FIBERGLAS IS IN YOUR LIFE . . . FOR GOOD!

LISTED UNDER REEXAMINATION SERVICE OF UNDERWRITERS' LABORATORIES, INC.
UL

This marker is now on the DUST-STOP label. Look for it . . . you can rely on it.

**DUST-STOP is the trade-mark of Owens-Corning Fiberglas Corporation for impingement type air filters made of glass fibers. FIBERGLAS is the trade-mark (Reg. U. S. Pat. Off.) of Owens-Corning Fiberglas Corporation for a variety of products made of or with glass fibers.*

OWENS-CORNING
FIBERGLAS

**DUST-STOP is the trade-mark of Owens-Corning Fiberglas Corporation for impingement-type air filters made of glass fibers.*

YOU CAN BE **SURE**.. IF IT'S

Westinghouse

MOTOR
EXCHANGE
SERVICE

For Westinghouse
single-phase and three-phase
1 to 20 hp
frame 203 to 326 a-c motors

Another Life-Line First!

The Broadest Exchange Plan!

Since February, 1949, Life-Line motors have offered you the broadest exchange plan in industry. All 1 to 20-hp, single-phase and three-phase a-c motors in frame 203 to 326 are included. No other manufacturer of motors—large or small—provides exchange service that compares in scope to this new Life-Line Motor Exchange Service.

120 Westinghouse exchange points assure you rush motor replacement service anywhere in the United States. Replacement motors, covered by this plan, are in stock, ready to be speeded to you at any time.

And what's more, if a motor fails during warranty period, it may be exchanged *free* for a motor of identical rating. The *exchange price,* beyond warranty, *is not dependent on the time in service . . . one year, five years or ten years.*

This service is one more advantage you get with Life-Line motors. Add this to all-steel construction . . . pre-lubricated bearings . . . an indicated savings of $750 per year per 100 motors . . . and you'll see why Life-Line has gained leading acceptance in the motor industry.

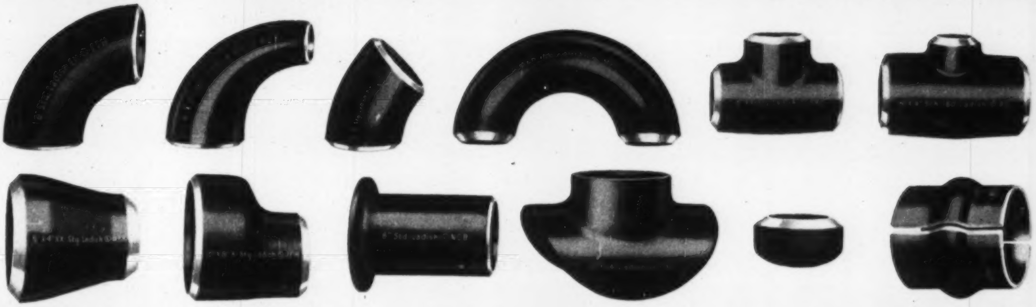
Complete details on the Life-Line Exchange Service—lists of exchange points and motor ratings covered—are given in the new booklet SM-5243. Get your copy today from your nearby Westinghouse representative or write direct to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna. J-21533

Westinghouse
Life-Line
Motors

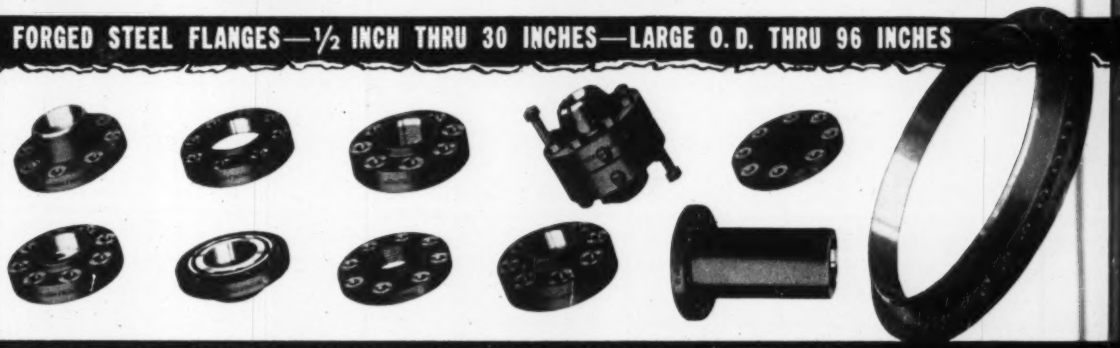
L
TO MARK PROGRESS

Unrestricted Selection

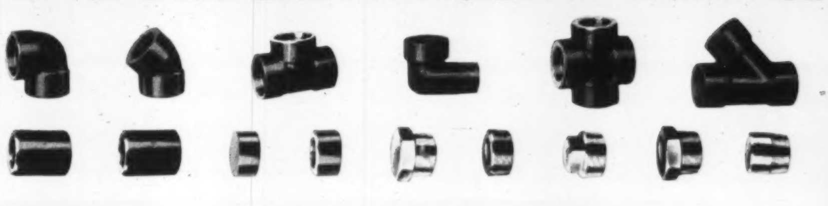
SEAMLESS WELDING FITTINGS—½ INCH THRU 30 INCHES



FORGED STEEL FLANGES—½ INCH THRU 30 INCHES—LARGE O. D. THRU 96 INCHES



FORGED STEEL FITTINGS—SCREWED AND SOCKET WELDING—⅛ INCH THRU 4 INCHES



All Available in

CARBON • ALLOY
STAINLESS STEELS
ALUMINUM
COPPER & OTHER
NON-FERROUS
METALS

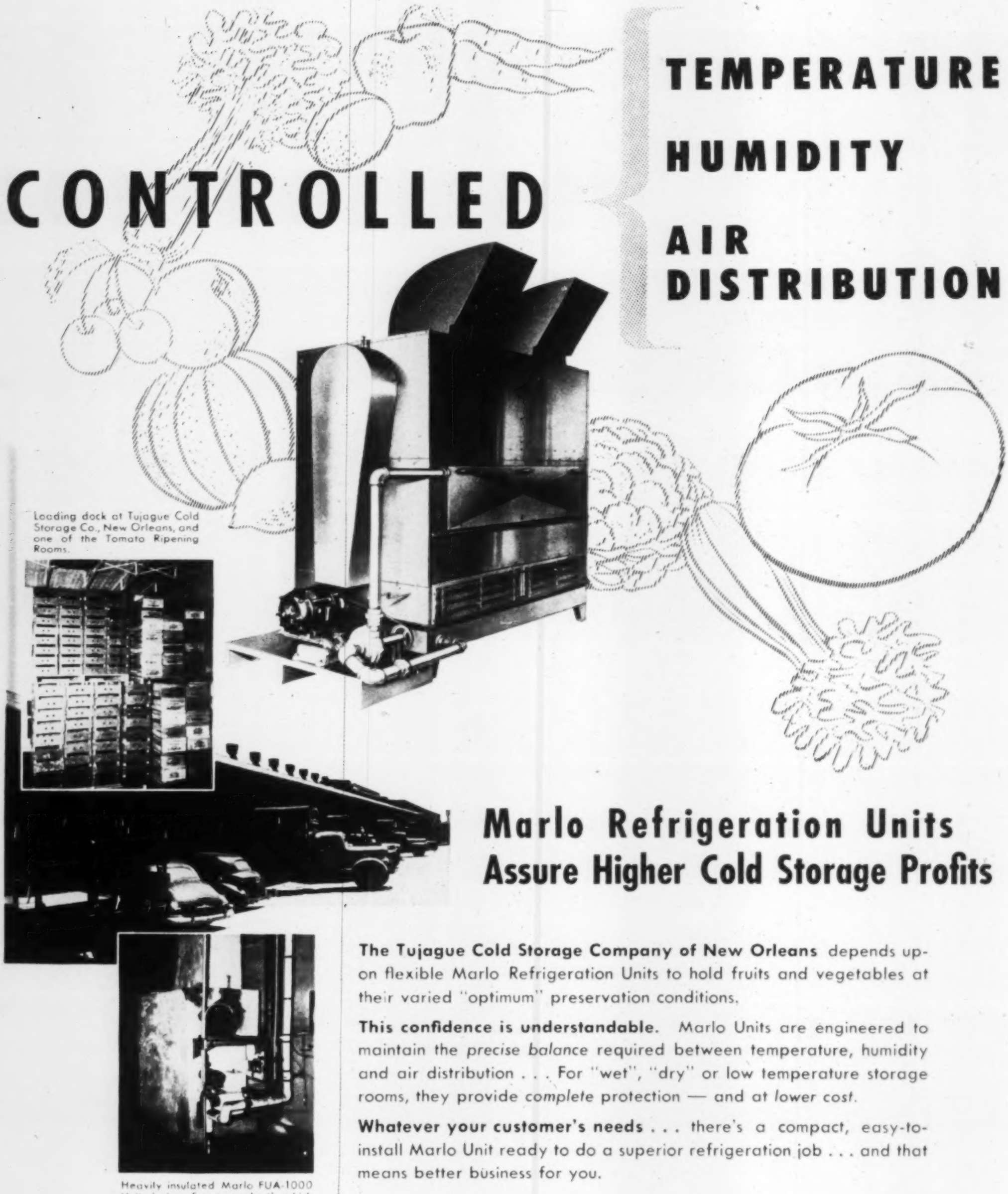
A COMPLETE LINE PRODUCED UNDER ONE ROOF
... ONE RESPONSIBILITY

LADISH CO.

CUDAHY, WISCONSIN
MILWAUKEE SUBURB

DISTRICT OFFICES: New York • Buffalo • Pittsburgh • Philadelphia • Cleveland
Chicago • St. Paul • St. Louis • Atlanta • Houston • Los Angeles

Standardizing on Ladish assures unrestricted selection in meeting your entire fittings requirements. Here, at one responsible source, you get all three . . . Seamless Welding Fittings, Forged Steel Flanges and Forged Steel Fittings . . . in a complete range of types, sizes and materials, plus the dependability obtainable only with Ladish Controlled Quality.



CONTROLLED

TEMPERATURE

HUMIDITY

AIR DISTRIBUTION

Loading dock at Tujague Cold Storage Co., New Orleans, and one of the Tomato Ripening Rooms.

Heavily insulated Marlo FUA-1000 Unit (using Freon coolant) which serves Tomato Ripening Rooms.

Marlo Refrigeration Units Assure Higher Cold Storage Profits

The Tujague Cold Storage Company of New Orleans depends upon flexible Marlo Refrigeration Units to hold fruits and vegetables at their varied "optimum" preservation conditions.

This confidence is understandable. Marlo Units are engineered to maintain the *precise balance* required between temperature, humidity and air distribution . . . For "wet", "dry" or low temperature storage rooms, they provide *complete* protection — and at *lower cost.*

Whatever your customer's needs . . . there's a compact, easy-to-install Marlo Unit ready to do a superior refrigeration job . . . and that means better business for you.

Send for information on the complete Marlo line.

Installed with Worthington Compressors by Pan American Equipment Co., New Orleans. Weil & Moses, New Orleans, were the engineers.

MARLO - HEAT TRANSFER
Since 1925

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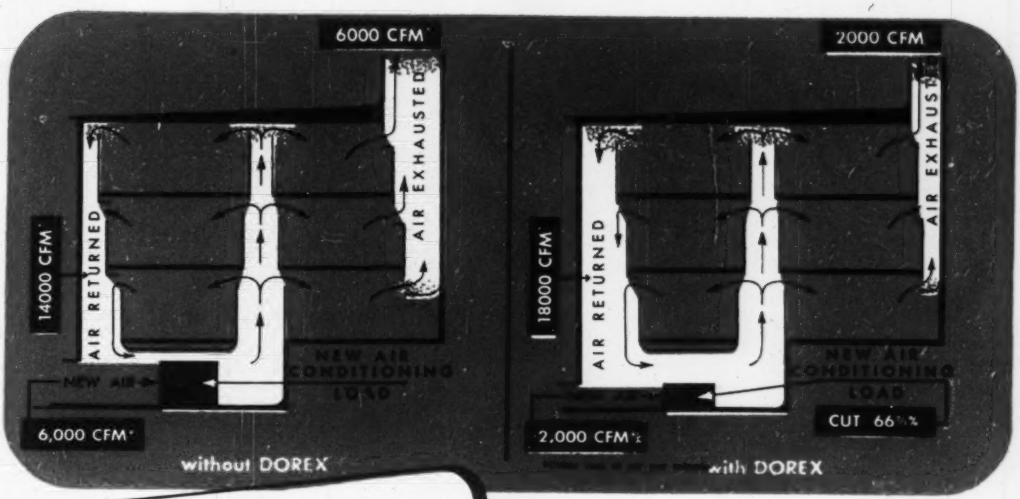
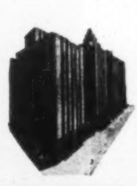


How Much Money can Dorex Air Recovery save?

Briefly, here's the answer: Every 1,000 cubic feet of conditioned air that is exhausted per minute costs over $200.00 a year. If, for instance, you are exhausting 6,000 CFM, you are, in effect, throwing out $1,200.00 worth of conditioned air.

Suppose Dorex could cut that only in half. That would mean $600.00 worth of conditioned air saved. But Dorex has been able to cut air conditioning exhaust—and the unconditioned outdoor air needed to replace it—*as much as 75%* in many cases.

Dorex changes *used* indoor air back to its original outdoor freshness by removing the odorous gases that make the air stale, stuffy and unpleasant. With Dorex, you can recirculate more of the indoor air you have already heated or cooled, cut down your outside air intake and reduce your equipment and operating cost.



The Criminal Courts Building in New York saves money with Dorex. This famous building is just another one of the 5,000 Dorex installations furnishing more and better air conditioning at lower cost.

Net saving for each 1000 CFM recovered averages $240.00

Based on year-round conditioning system in average temperate zone.

Cost to condition 1000 CFM outdoor air per annum

Refrigeration Machinery (3 tons @ $250.00)	$750.00	
Heating Equipment (100,000 BTU @ .0025)	250.00	
15% Interest and Amortization on $1,000.00		$150.00
Power (Average 1.5 tons x 1 KW x 1200 hrs. x $0.02)		36.00
Oil (Average 0.47 gals. x 2600 x .08)		98.00
Water plus pumping cost (based on Cooling Tower)		10.00
		$294.00

Cost to recover 1000 CFM recirculated air per annum

DOREX Air Recovery Equipment installed	$160.00	
15% Interest and Amortization on $160.00		$ 24.00
Carbon Reactivation Cost (once per year)		30.00
		$ 54.00

Net annual savings per 1000 CFM $240.00

Engineers, contractors and dealers who have this book say it's a helpful "sales tool" in convincing those who are reluctant to invest in air conditioning in these "cost-conscious" days.

FREE BOOK
W. B. Connor Engineering Corp.
Dept. D-11, 112 East 32nd St.
New York 16, New York.

I'm interested in saving money on air conditioning. Please send me my FREE copy of "Green Air."

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Air Diffusion • Air Purification • Air Recovery
112 East 32nd Street CONNOR New York 16, N.Y.
IN CANADA: Douglas Engineering Co., Ltd., 190 Murray Street, Montreal 3, P.Q.

FHA APPROVED

Partial view of Meadowbrook Apartments, Indianapolis, Indiana. Owners: Meadowbrook Sponsors. Architects and Engineers: Allen and Kelley. General Contractor: Mars Engineering, Inc. Heating and Plumbing: Freyn Brothers, Inc. Electrical Contractor: Hatfield Electric Co. All of Indianapolis, Indiana.

GARDEN APARTMENT COMMUNITY USES 5½ MILES OF

Webster Baseboard Heating

Heating for the $5,500,000 Meadowbrook Apartments, Indianapolis, Indiana, is Webster Baseboard Heating —5½ miles of it.

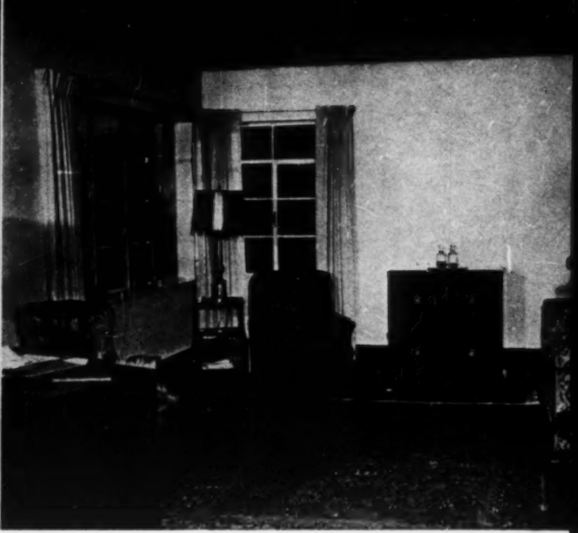
"The sponsors were convinced after a thorough investigation, that Webster Baseboard Heating would provide the best type of heating system at a reasonable cost for Meadowbrook tenants." So says Alvin Jones, president of Meadowbrook Corporation.

Financing for Meadowbrook Apartments was provided by a $4,792,500 loan from the John Hancock Life Insurance Company of Boston, and insured under Federal Housing Administration 608. Rentals under FHA procedure for such a program average $90 per month, including refrigerator, range, heat and water.

Many families are already occupying some of the 648 one and two-bedroom apartments and are enjoying the complete heating comfort and benefits of Webster Baseboard Heating. Each of the 37 two-story buildings has its own oil-fired heating unit, and every tenant has individual control of his own heating system.

With floors, walls and ceilings evenly

Dining area in a living-dining room of one of the apartments. Door at right leads to compact kitchen. Apartments contain one and two bedrooms.



Living room shows how baseboards painted to harmonize with decorative scheme are practically invisible. Webster Baseboard Heating gives complete freedom in arranging room interiors. There's nothing to interfere with drapes or furniture.

warmed by genuine, perfected Webster Baseboard Heating, Meadowbrook Apartments heating costs are kept to a minimum. 72° room temperatures are maintained easily even in the coldest weather. Webster Baseboard Heating is *clean* heat, *convected* heat . . radiant heat in its most practical form. Owners of Meadowbrook are looking forward to minimum fuel costs this heating season.

If you haven't already included Webster Baseboard Heating in your 1950 plans, then do so now. The Webster Representative in your locality will furnish complete details — let us give you his name.

Address Dept. HP-1

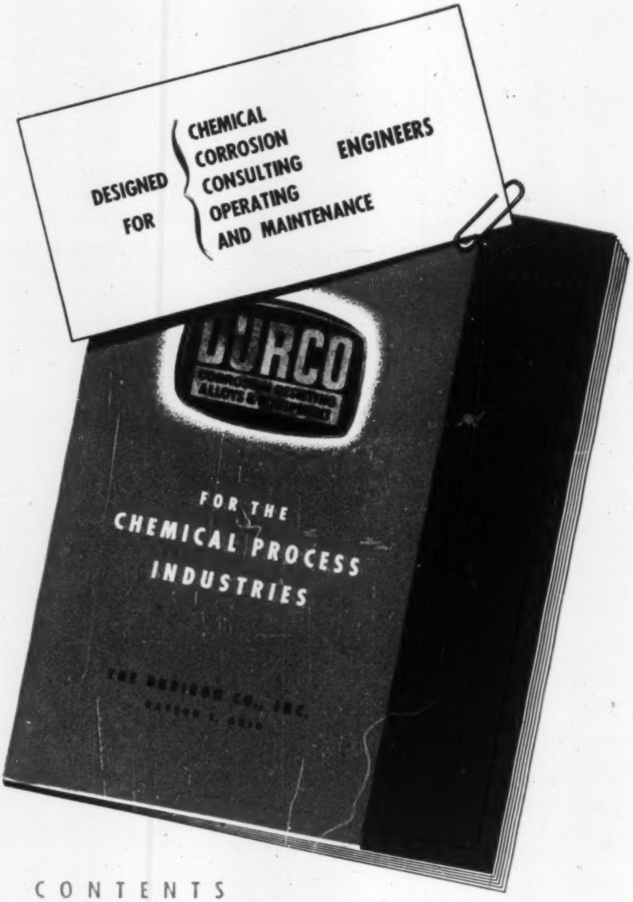
WARREN WEBSTER & CO.

Camden 5, N. J. : : Representatives in Principal U. S. Cities : : *In Canada, Darling Brothers, Limited, Montreal*

Webster

BASEBOARD HEATING

THE NEWEST, MOST COMPLETE Catalog of Corrosive-Handling Equipment



Get *your* copy of this 12-page general catalog of the latest answers to corrosive handling problems. It is a complete, quick-reference file on corrosion-resistant equipment and alloys.

The booklet covers Durco's entire line of special alloys, process equipment and services. Essential data on features, sizes, capacities and applications are boiled down and organized so you can *quickly* spot what you want. Your eye travels directly from a product to the alloys it is made in, then to applications and sizes and capacities.

Each of Durco's specialized, corrosion-resistant alloys are treated from a metallurgical, physical and chemical service-range standpoint.

As an extra help, the catalog names the detailed bulletins available on each item and a business reply card is enclosed to make it easy to get those you want.

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Testing and Inspection
Technical Service
Alloys
Resistance of Durco Alloys to Corrosive Solutions
Special Recommendations

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- Valves, Float & Relief
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THE DURIRON CO., INC.
DAYTON 1, OHIO
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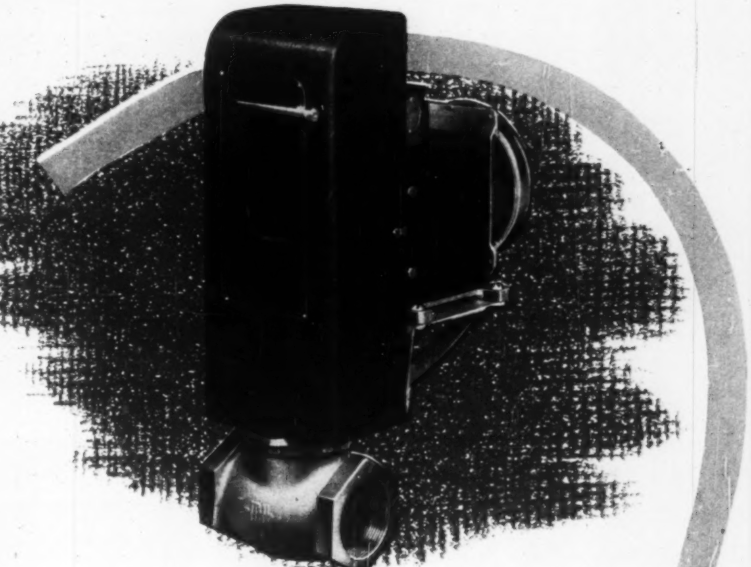
Durco Adv. 185-GA

New Honeywell Spring Return Motorized Valve Permits Heat to Pass, Even Though Electric Power Fails



Now, in a single, complete unit you get the dependable performance of Honeywell's famous motorized valve, PLUS positive protection against power failure from a powerful spring return mechanism. If the power fails, the spring return automatically positions the valve to full open — or full closed, as required. There is no external spring construction. And the new, more powerful motor has a 160-degree stroke.

Here's another instance of *Honeywell Superiority* — three-way superiority through dependable, trouble-free performance; simplified, all-in-one installation; and protection against any operating emergency.

It's this kind of practical approach — with the product made to fit the need — that has established *Honeywell Superiority*. It's reliable, year-after-year performance that has maintained *Honeywell Superiority*. Quite naturally, it's this superiority that makes Honeywell the leader in automatic control. Minneapolis-Honeywell, Minneapolis 8, Minnesota. In Canada: Leaside, Toronto 17, Ontario.

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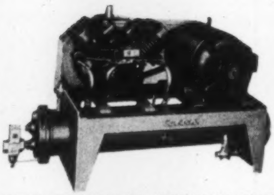
Honeywell
CONTROL SYSTEMS

73 BRANCHES FROM COAST TO COAST WITH SUBSIDIARY COMPANIES IN: TORONTO • LONDON • STOCKHOLM • AMSTERDAM • BRUSSELS • ZURICH • MEXICO CITY

SEE THIS FAMOUS LINE IN DALLAS
IN JANUARY • BOOTH No. 307

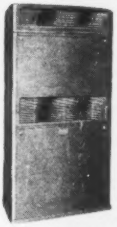


WATER-COOLED CONDENSING UNITS—Shell and Tube Type

You can increase your profits because you can handle any

AIR CONDITIONING • REFRIGERATION • OR AIR MOVING JOB

with Curtis equipment



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in Saturday Evening Post,
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PACKAGED TYPE AIR CONDITIONERS — 2½-8 Ton

The New Curtis line reflects the many advantages gained from almost a century of accumulated experience in engineering, designing and manufacturing. You can install Curtis equipment with the knowledge beforehand that it will operate dependably with the highest degree of efficiency and quietness. Your customer will be happy, your reputation enhanced, your profits greater. Write for complete detailed information about a Curtis franchise.

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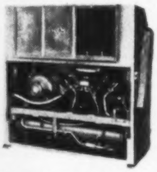

CENTRAL TYPE AIR CONDITIONERS—10 and 15 Ton

96 YEARS
of
SUCCESSFUL
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CURTIS REFRIGERATING MACHINE DIVISION
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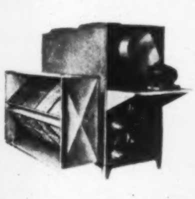


CEILING and FLOOR TYPE AIR HANDLING UNITS

R-49-17

Precision Engineered

FROM DRAWING BOARD TO ON-THE-JOB PERFORMANCE

RIC-WIL Prefabricated Insulated Pipe Units Speed Installation of Underground-Overhead Process Steam Line

A PROCESS STEAM LINE recently installed at a large adhesives manufacturing plant demonstrates many of the outstanding advantages of Ric-wiL *Prefabricated* Insulated Piping Systems.

Process steam leaving the boiler head at 145 psi is delivered to the adhesives mixers—a key operation—by a line constructed of Ric-wiL Hel-cor Pipe Units carrying an 8" steam pipe and 3" condensate return. Both pipes are insulated and housed in the same conduit, which runs underground beneath two railroad tracks and a concrete roadway as well as overhead between and alongside various plant buildings.

All units, accessories and sub-assemblies were accurately prefabricated at the Ric-wiL factory to individual specifications of this installation. With the complete system and all details laid out on the drawing board, pipes were cut to precise lengths required and each component unit was precision prefabricated. Each unit was identified for its exact position in the system, ready for single handling installation upon delivery, with a minimum of field work and time required.

The inherent flexibility of Ric-wiL Insulated Pipe Units makes it possible to provide adequate compensation for stresses and reactions caused by expansion, using a minimum of expansion devices. Only one expansion loop was required for this installation since a substantial portion of the expansion was absorbed in directional changes of the line.

Precision prefabrication, protection and insulation by Ric-wiL time-proved methods assure piping systems of high thermal efficiency, corrosion resistance, durability and strength, coupled with speedy, low-cost installation.

★ **Ric-wiL Prefabricated Insulated Piping Systems are made-to-order for distribution piping of process liquids, viscous fluids, oil, refrigerants, steam, hot or cold water. Ric-wiL engineers will be glad to consult with you on your insulated piping problems —without charge or obligation. For full information write The Ric-wiL Co., Dept. 2X.** ★

RIC-WIL

INSULATED PIPING SYSTEMS

THE RIC-WIL COMPANY • CLEVELAND, OHIO

REPRESENTATIVES IN PRINCIPAL CITIES

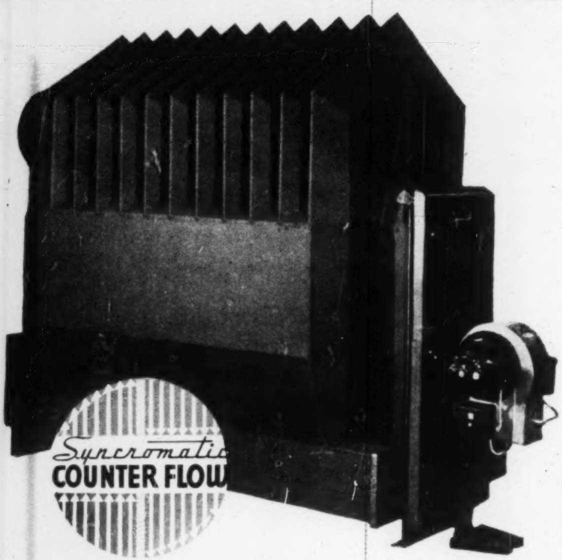
SYNCROMATIC

AGAIN the BEST!!

HIGH EFFICIENCY HI-CAP STEEL FURNACES

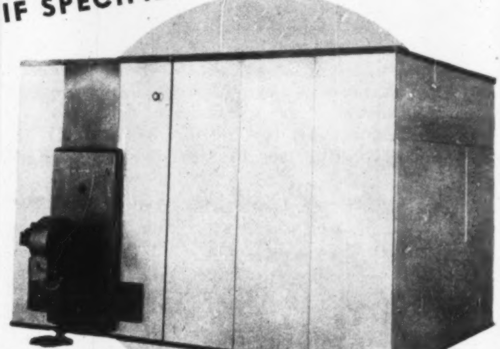
HIGH CAPACITY

OIL FIRED IN 10 SIZES — 350,000 TO 1,000,000 B.T.U. CAPACITY



- **FAMOUS** *Syncromatic* **COUNTER FLOW DESIGN**
- **HIGH CAPACITY COMBINED WITH HIGH EFFICIENCY**
- **HEAVY CONSTRUCTION NO HOT SPOTS**
- **ADAPTABLE FOR AUTOMATIC FIRING WITH ALL FUELS**

CAN BE TAKEN THRU 3 FOOT DOOR IF SPECIFIED "KNOCKED DOWN"



SYNCROMATIC OFFERS YOU A TRULY COMPLETE LINE OF WARM-AIR FURNACES FOR ALL FUELS — FOR ALL RATINGS. USE OF SYNCROMATIC'S FAMOUS COUNTER FLOW DESIGN PRODUCES EFFICIENCIES IN EXCESS OF 80 PER CENT. THIS HI-CAP SERIES HAS ALSO BEEN DESIGNED TO MEET THE HEATING CONTRACTOR'S PROBLEMS IN ERECTION AND INSTALLATION OF LARGE UNITS.

FULL DETAILS AND INFORMATION WRITE OR CALL —

Syncromatic Corporation
WATERTOWN, WISCONSIN

Kno-Draft

. . . the completely adjustable Air Diffusers, specified by Western Union for big, high speed communications center at Philadelphia

These Kno-Draft features insure satisfaction.

Fig. 1.

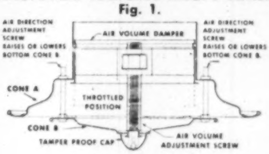
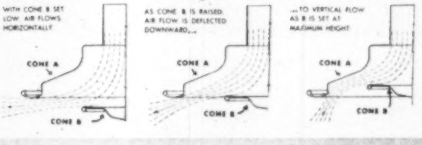

AIR DIRECTION ADJUSTMENT SCREW RAISES OR LOWERS BOTTOM CONE B
AIR VOLUME DAMPER
AIR DIRECTION ADJUSTMENT SCREW RAISES OR LOWERS BOTTOM CONE B.
CONE A
THROTTLED POSITION
CONE B
TAMPER PROOF CAP
AIR VOLUME ADJUSTMENT SCREW

Fig. 1. Type D Air Volume Control consists of a cylindrical, sliding, sleeve-type damper, connected by a specially designed spider to a centrally operated screw. It varies only the quantity, not the characteristics, of the air distribution. **Fig. 2.** Any angle of air discharge can be obtained by raising or lowering bottom Cone B.

Fig. 2.


WITH CONE B SET LOW AIR FLOWS HORIZONTALLY
CONE A
CONE B
AS CONE B IS RAISED AIR FLOW IS DEFLECTED DOWNWARD...
CONE A
CONE B
...TO VERTICAL FLOW AS B IS SET AT MAXIMUM HEIGHT
CONE A
CONE B

In spaces filled with mechanical equipment, cable racks, transmitting machinery and storage partitions, Kno-Draft's facility for delicate regulation of air volume and direction enabled the air conditioning engineers to produce precisely the air pattern best suited for the purpose of each area in the communications center.

The system was balanced to within 5% and the temperatures equalized so evenly that measurements showed a maximum difference of only one-half degree throughout.

FREE HANDBOOK—Send for FREE copy of new handbook on air diffusion. Complete information on Kno-Draft Adjustable Diffusers and all necessary engineering data to help you create "custom-made" air patterns. Just fill in and mail the coupon.

W. B. CONNOR ENGINEERING CORP.
Dept. D-21, 112 East 32nd Street, New York 16, New York

Please send my FREE copy of the new Kno-Draft Handbook on Adjustable Diffusers.

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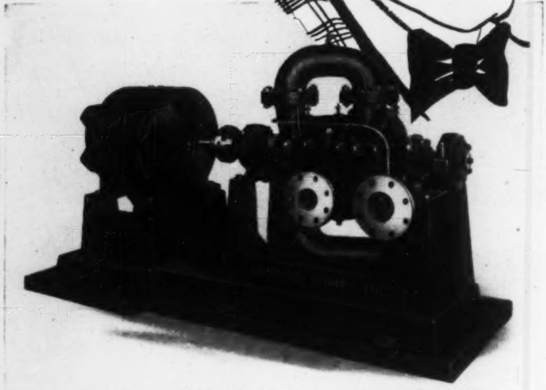
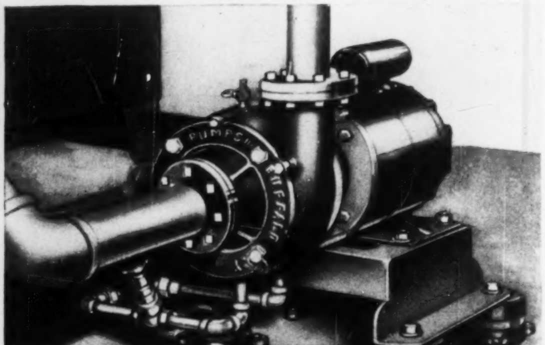
ECONOMY

THE INEVITABLE RESULT
OF TROUBLE-FREE
"Buffalo" PUMP PERFORMANCE



"Buffalo" Class "RR" Pump for Boiler Feed and Other Clear Water Service.



"Buffalo" No. 1½ CCS Close-Coupled Pump Circulating Water for Air Conditioning.

"Buffalo"
CENTRIFUGAL
PUMPS FOR
EVERY SERVICE

- Ask anyone who has used pumps a good long while—he'll say the ECONOMICAL pump is the one you can practically ignore! It not only saves on repair bills, but on expensive timeouts where plant functions depend on pumping.

- If you want this major economy, specify "Buffalo" for your next pumping job. "Buffalo" construction—impellers, bearing stands, shafts, casings and stuffing boxes — makes no compromise with quality. Add to this the economy of high-efficiency performance—and the inevitable result of owning a "Buffalo" Pump is economy that adds up through the years. Call in your "Buffalo" engineering representative, or write us for complete information.

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You can depend on WHITE-RODGERS to

SATISFY YOUR EVERY NEED

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- ★ Rapid response to temperature changes
- ★ Positive settings because accurately calibrated
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- ★ No temperature drift—permanently calibrated
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- ★ Easily adjusted, needs only a screwdriver
- ★ Consistent differential, because mechanical
- ★ Sturdier switch because of Hydraulic-Action
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- ★ Not affected by ambient temperatures

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With the All-Star Features

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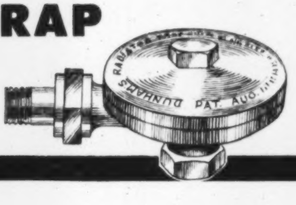
Controls
FOR REFRIGERATION · HEATING
AND AIR CONDITIONING

From the FIRST RADIATOR TRAP



To a MODERN VARI-VAC SYSTEM

Social Security Institute
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Consulting Engineer—Salvadore M. Martini Tejeda
Heating Contractor—Termodinamica S. A.

DUNHAM *has always meant* GUARANTEED HEATING PERFORMANCE

savings up to 40%

Forty-seven years ago, C. A. Dunham led the field with the first successful thermostatic radiator trap. Today, Dunham still leads with Vari-Vac* Differential Heating—a precision temperature control system so successful that Dunham has given a *written guarantee* on many jobs *to cut fuel costs at least 25%*.

Vari-Vac Heating effects these sensational savings by utilizing a continuous flow of steam at temperatures that vary with the weather. Heat supply and heat demand are always in perfect balance, assuring maximum comfort for building occupants.

job scaled to your Customer's requirements

Recent engineering advancements have made this remarkable heating system adaptable to any size structure. A Dunham Engineer can quickly tell you which one of seven different size systems your customer will want installed.

Don't overlook this practical—and guaranteed—way to obtain better temperature control for your customer, slash his operating costs. If he's planning new construction . . . or a "change-over" of his present heating plant . . . it will pay you to investigate Dunham Vari-Vac today.

SEND FOR FREE BOOKLET

Bulletin 509 gives you complete information for "Job-scaled" Vari-Vac Heating; tells you what it is, how it operates, how it may be fitted exactly to your customer's needs. For your copy, write

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HEATING MEANS BETTER HEATING

SEARS ROEBUCK
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MERCANTILE BANK BUILDING

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In this great Texas city — and in other major centers throughout the Lone Star state — air conditioning is an important part of new commercial, institutional and industrial construction. *At the vital point of air delivery* in many of these important buildings, Aerofuse Diffusers are specified for installation. From experience, the outstanding engineers, architects and contractors — responsible for the performance and appearance of these jobs — know that Aerofuse Diffusers are engineered to meet the most rigid requirements of air distribution . . . are styled to harmonize with the most modern interior design.

Aerofuse Diffusers are available in a wide range of types and sizes . . . for the details, selection information, complete engineering data . . . write for a copy of Catalog 102.

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WITH No. 4 CONTROL UNIT

Typical of the advanced engineering that is an important part of the Aerofuse line, TYPE EAC is equipped with a manually-operated auxiliary effective area control ring. Provides a simple method of varying performance by adjustment of throw . . . on the job. No. 4 Control Unit assures minute regulation of volume.

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Western Electric Company

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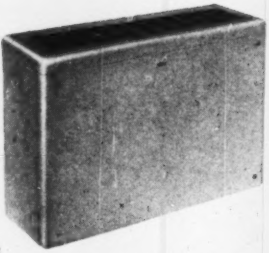
Booth No. 311
Southwest Air Conditioning Exposition
Dallas—Jan. 23 to 27

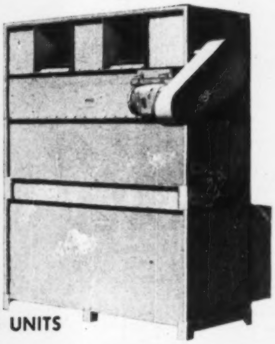
TUTTLE & BAILEY inc

NEW BRITAIN, CONNECTICUT

VERTICAL TYPE
UNIT HEATERS



CABINET TYPE
UNIT HEATERS



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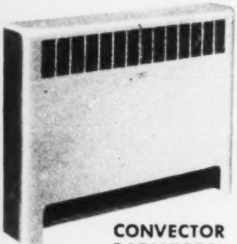
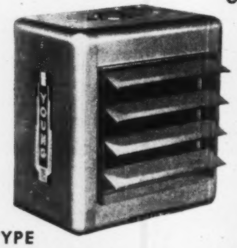
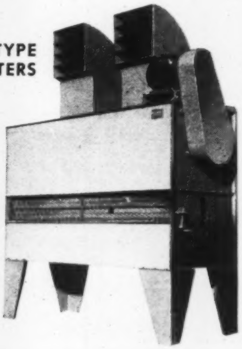
In Every Case SPECIFY...
YOUNG
SPECIALISTS IN HEATING, COOLING AND AIR CONDITIONING EQUIPMENT FOR HOME AND INDUSTRY



CONVECTOR
RADIATORS



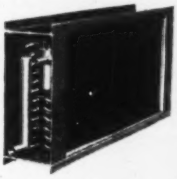
HORIZONTAL TYPE
UNIT HEATERS



BLOWER TYPE
UNIT HEATERS

HEATING COILS

COOLING COILS



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Heat Transfer Products for Automotive and Industrial Applications.

Heating, Cooling, and Air Conditioning Products for Home and Industry.

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A JOY Axivane Fan in a commercial store—chosen for its low noise level, compactness, and simple and easy installation.

The JOY AXIVANE® FAN

Mounts Right in the Air Duct—

Saves space, installation costs, gives you quieter, more efficient ventilation!

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IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

OUR BUSINESS IS IMPROVING YOUR BUSINESS

BETTER AIR CONDITIONING FOR YOUR CLIENTS

In all your planning for clients, remember that any business can be made a better business with YORK air conditioning and refrigeration. Each YORK product is designed to cut costs, improve service, make a profit for those who install it. YORK gives you real help on every job, from the first outline to the final installation. With YORK you get experienced aid all the way through, with full cooperation from a national organization that maintains branch offices and trained engineers throughout the country.

"See Your Architect, Engineer, Contractor, First"

YORK believes in channeling contract work through *You*... and YORK gives you unequalled support in providing the owner with the finest central station system possible.

- **a complete line of equipment**
- **competitive prices**
- **accurate, dependable product ratings technical assistance based on "case histories"**
- **cooperation with architects, engineers, and contractors**
- **practical help from York-Trained Engineers**
- **a national organization**
- **continuous product research and development**
- **certified maintenance**

YORK Engineers have at their command an inexhaustible supply of practical information gathered from thousands of successful York-equipped installations. This information and their services are at *your* disposal. If you are "planning" any work involving air conditioning or refrigeration, call your nearest YORK Office. You get impartial, experienced help from the start. York Corporation, York, Pennsylvania.

PIONEERS IN INVENTION AND DEVELOPMENT SINCE 1874

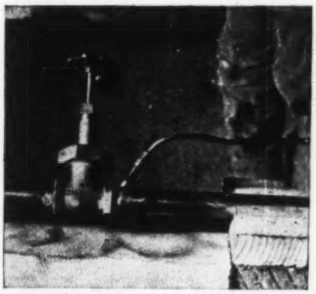
York
refrigeration
air conditioning

Refrigeration and Air Conditioning

HEADQUARTERS FOR MECHANICAL COOLING SINCE 1885

The UN Secretariat
is
a **TRULY MODERN** building

...**SILBRAZ**® *joints are installed*



Making a Silbraz joint with a Walseal Gate Valve at UN, work being done at bench.

New UN Secretariat Building, N. Y. C.
Syska and Hennessy, Inc., *Consulting Engrs.*
Fuller-Turner-Walsh-Slattery, Inc.,
General Contractor
Eugene Duklauer, Inc., *Plumbing Contractor*
Almirall & Company, Inc.,
Heating Contractor

Installing a Walseal fitting at UN, on location; note operator progressively heats small section of the fitting.

Architects and builders know that it takes modern building components to make a modern building. That's why the first skyscraper erected on the site of the United Nations' buildings has brass and copper pipe runs joined with Silbraz joints—the modern way of joining brass or copper pipe or Type B copper tubing. Silbraz joints are silver brazed—not soldered or threaded—and are stronger than the pipe itself. They are leakproof, permanent, and will not creep or pull apart under any condition which the pipe or tubing can withstand. They literally form "one-piece pipelines" that save money by eliminating leaky connections, costly maintenance, and repairs.

Walseal® Valves and Fittings for making Silbraz Joints

The Walworth Company manufactures a complete line of Walseal Valves, Fittings, and Flanges for making Silbraz joints. The Walseal material used in the United Nations building was furnished by Glauber, Inc., and Asco Supply Company, Inc., both of New York City.

For further information regarding Walseal Valves, Fittings, and Flanges for making Silbraz joints, see your nearest Walworth distributor, or write for Circular 84B.

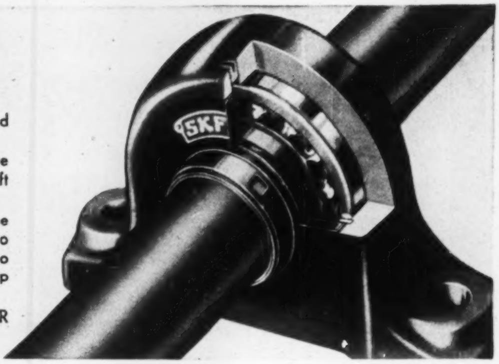
Make it a "one-piece pipeline" with Walseal

WALWORTH
valves and fittings
60 EAST 42nd STREET, NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

The SKF SUA unit pillow block

its DESCRIPTION



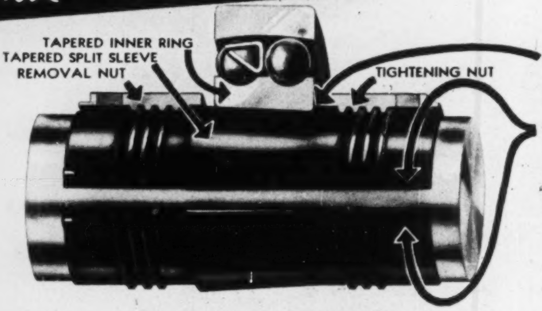
To maintain a *tight fit* between bearing and shaft, you need an SKF SUA unit pillow block.

It's completely assembled, lubricated and ready for immediate use. Available in "free" and "held" types . . . and in shaft sizes from 1 7/16" to 2 7/16".

Its SKF-exclusive Align-O-Seals prevent lubricant leakage and dirt intrusion. No exposed bearing . . . no lock screws to raise troublesome burrs on the shaft . . . for the nut is locked to the sleeve. Even though the shaft vibrates, the concentric grip will not loosen.

Designated as type SUA with ball bearings—and type SUAR with spherical roller bearings.

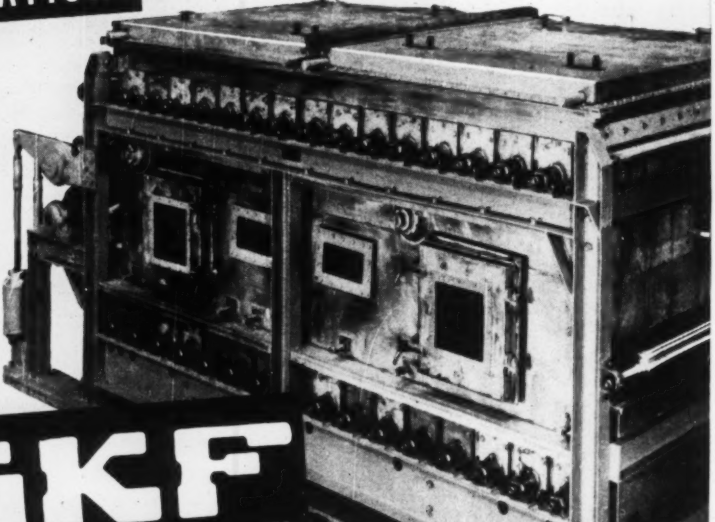
its CONSTRUCTION



TIGHT FIT results when the tightening nut pushes the tapered inner ring over the tapered split sleeve.

CONCENTRIC GRIP is firm and positive—as the split sleeve contracts and wraps around the shaft. Removal is accomplished by reversing the process—with tightening nut loosened, removal nut pushes inner ring off the sleeve.

its APPLICATION



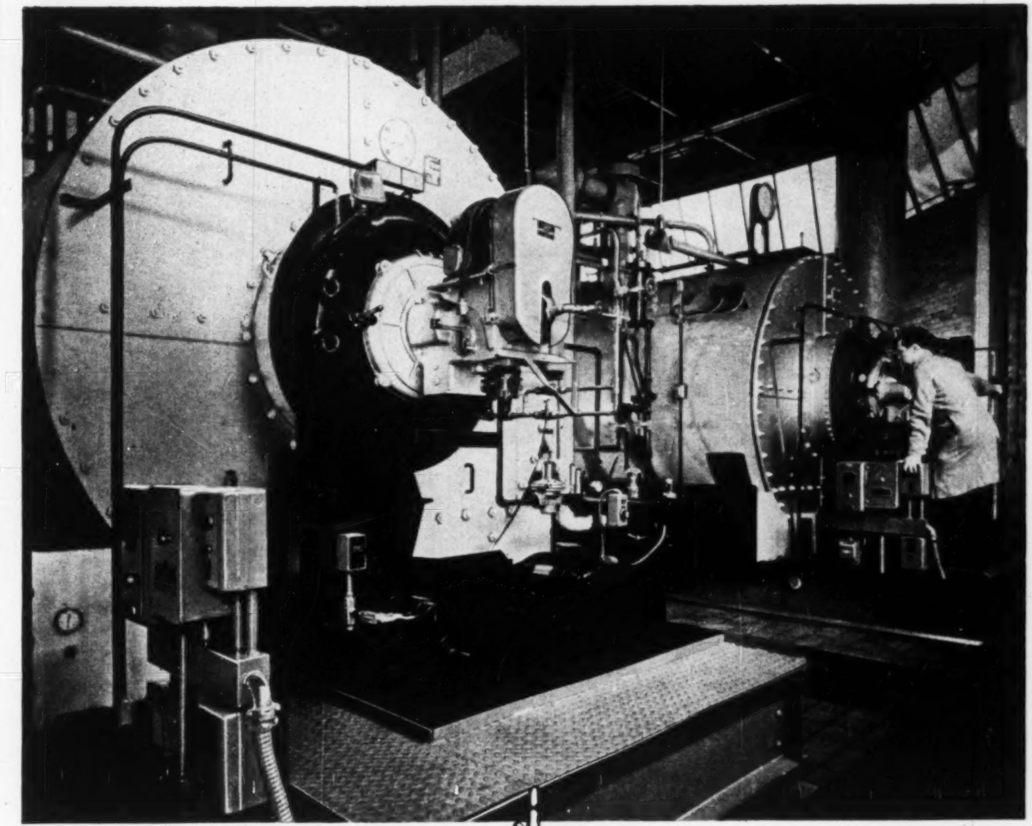
THE GREENVILLE STEEL AND FOUNDRY COMPANY of Greenville, S. C., specified SKF SUA units and built a "tight fit between bearings and shafts" into this DuPont Steamer for piece goods drying.

64 SKF SUA 107 unit pillow blocks help maintain long-range dependability on this unit which operates at 150 yards per minute maximum. Our engineers can show you why the SKF SUA unit pillow block belongs in your specifications. Write today.

6600

SKF

INDUSTRIES INC., PHILADELPHIA 32, PA.



Never Forget

BOILERS BURN DOLLARS . . .

Yes — generating steam costs money — money for fuel, boiler operation, care and maintenance. An old or outmoded fuel-wasting boiler can burn many hidden dollars through excessively high steam costs.

It's sound business to install boilers that give you the most for your steam dollars — modern, guaranteed high efficiency Cleaver-Brooks boilers, using oil or gas as fuel.

For any boiler installation (15 to 500 HP.)—new or replacement—Cleaver-Brooks offers these immediate and long-range cost-saving advantages:

A Custom-Planned Boiler Engineered for Your Needs: Your steam needs and steam-using equipment are studied — your present steam load plus your estimate of future expansion are considered — with this information the size of Cleaver-Brooks Boiler best suited to your specific needs is determined.

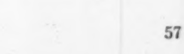
Factory Starting Service: Your boiler is placed in operation by Cleaver-Brooks factory service-engineers. Your operators are trained in operation, care and maintenance.

Flexible Operation Burning Gas or Oil With Equal Efficiency: You can use oil, gas, or combination oil and gas, whichever is of lower cost. Through their high heat transfer, Cleaver-Brooks boilers operate at a guaranteed efficiency of 80% from full load down to 30% of rating.

In addition, Cleaver-Brooks boilers give you clean, smokeless operation — eliminate fuel and ash handling — require no high or costly stacks — no special foundations — fit under low headroom — provide quick steaming, flexible operation to meet fluctuating loads — fully meet all codes.

Available in sizes 15 to 500 HP., 15 to 200 P.S.I. — write for Cleaver-Brooks steam boiler bulletin.

CLEAVER-BROOKS COMPANY
367 E. Keefe Ave., Milwaukee 12, Wis.



WRITE on your business letterhead for Steam Cost Calculator—a ready reference slide rule showing comparative steam costs when using oil, gas, or coal as fuel. Mailed on request — no obligation.

Cleaver-Brooks
STEAM BOILERS

no tricks!

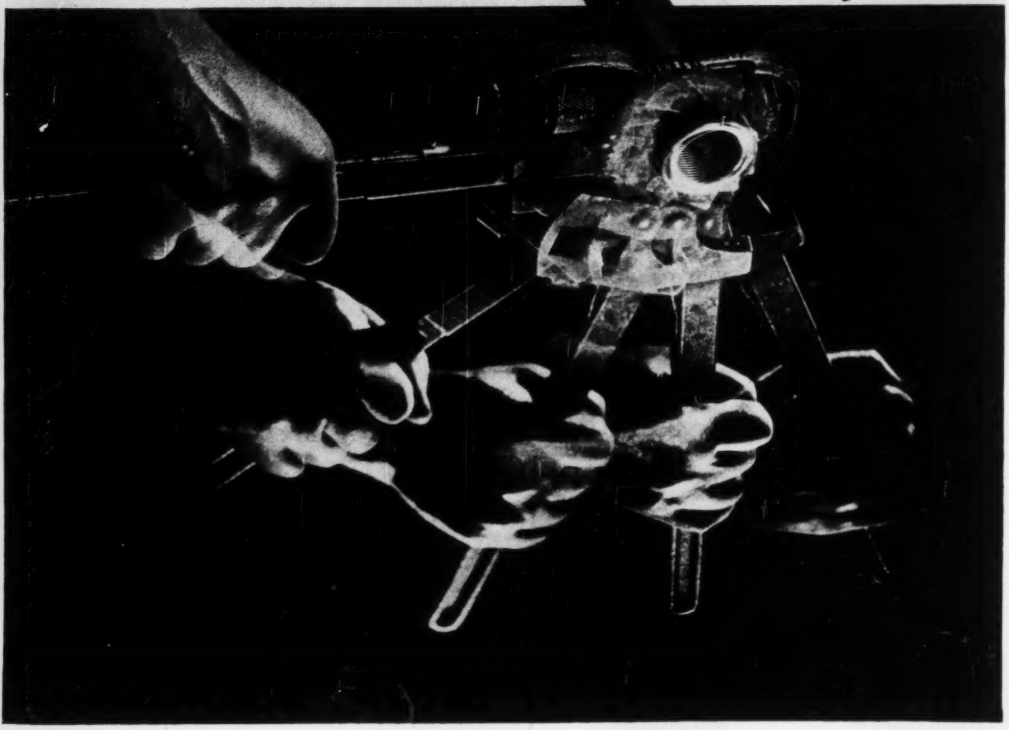
wheatland steel pipe for heating, piping and air conditioning

We don't use tricks or short cuts at Wheatland. Instead, we have found that producing enduring pipe requires years of experience, the most modern, scientific techniques and constant supervision. That is why users who demand the best, specify Wheatland. They know they will receive clean, pressure-tested pipe with precision threading, exactly suited to their requirements.

WHEATLAND TUBE COMPANY

Bankers Securities Building
Juniper & Walnut Streets • Phila. 7, Pa.

-pipe with the yearmark!



Electrifugal
PUMP
Electrifugal

first choice for Air Conditioning

RELIABLE, COMPACT, EASY TO INSTALL

MOTOR AND PUMP combined in a single unit means installation is easy. No extra parts to buy, no alignment problems. Less space is required than for base mounted units. Maintenance is reduced because alignment cannot change.

The *Electrifugal* Pump has a one piece cast iron yoke and bracket for mounting pump, eliminating a separate adapter. It uses a single shaft for both motor and pump. Further, the motor is specially designed and built by the same maker. Only Allis-Chalmers offers you the complete unit—pump, motor, control and drive—*all* of coordinated design and manufacture!

APPLICATION ENGINEERING SERVICE

Allis-Chalmers pump engineers, backed by the most modern pump research and testing equipment in the industry will help you select an *Electrifugal* pump or any other for your particular needs. Call your Allis-Chalmers Authorized Dealer or Sales Office today or see your Sweet's catalog for information on the full line of A-C pumps.

A-2936

Electrifugal is an Allis-Chalmers trademark.

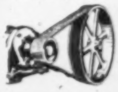
ALLIS-CHALMERS, 1171A SO. 70 ST.
MILWAUKEE, WIS.

Sold . . .
Applied . . .
Serviced . . .

by Allis-Chalmers Authorized Dealers, Certified Service Shops and Sales Offices throughout the country.

MOTORS — ½ to 25,000 hp and up. All types.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.



TEXROPE — Belts in all sizes and sections, standard and Vari-Pitch sheaves, speed changers.

ALLIS-CHALMERS

More and More... Engineers Agree that It's not **HOW MUCH** moisture you remove from a refrigeration system that counts...

...It's **HOW LITTLE** moisture is left!

SPORLAN
Catch-All
FILTER
DRIER

That is why they install a SPORLAN CATCH-ALL when they really want to dry a system.

They know that the Catch-All is the Perfect Filter-Drier because it dries down to a Low End Point... a point So Low that any remaining moisture is absolutely harmless!

why is th SPORLA *Catch-All* THE PERFECT FILTER-DRIER?

because

Its unique, porous cylinder is made up of minute particles of a highly efficient desiccant, whose efficiency is greater than that of the same desiccant in granular form.

because

After being completely assembled, it is activated to a high degree of dryness and immediately sealed with moisture proof seals to prevent any moisture from entering before installation.

because

It cannot powder!

because

It cannot pack!

because

The refrigerant cannot channel!

because

Being scientifically molded to provide progressive filtering it filters any foreign matter as minute as 9 microns with negligible pressure drop.

Having a molded, porous cylinder, the Catch-All is inherantly free from powdering, packing, and channeling. Designed scientifically to give maximum contact of refrigerant and desiccant, the Catch-All is a perfect filter and a perfect drier.

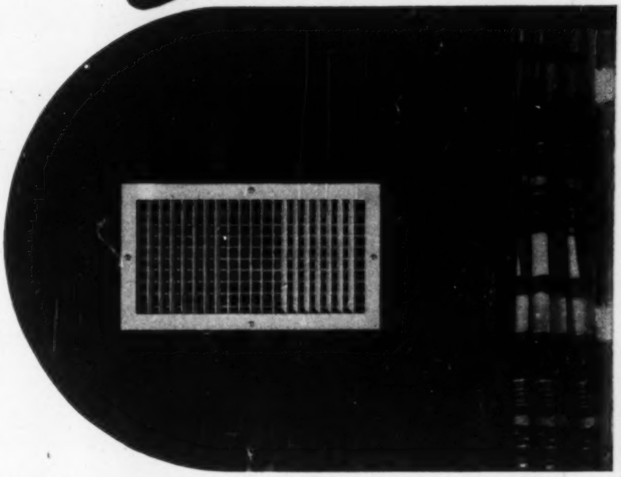
When you want clean Bone-Dry refrigeration systems... install Sporlan Catch-Alls and get Peak Performance on all installations

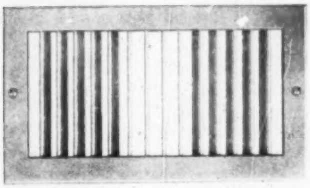
SPORLAN VALVE COMPANY
7525 SUSSEX AVE. • ST. LOUIS 17, MISSOURI

The Beautiful AUER *"Streamliner"*

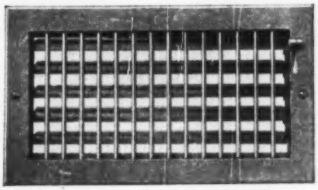
REGISTERS and GRILLES For High Velocity Outlets

- **Fully Adjustable**
- **Highly Efficient**
- **Moderately Priced**

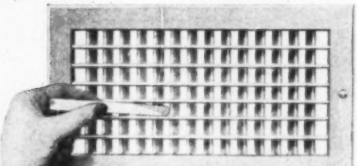




No. 1005V. Single bank of adjustable bars, no valve.



No. 1005V-HML. Single bank of adjustable bars, with multi-louvre valve.



No. 1205HV. Double bank of adjustable bars, no valve.

Streamliner wall registers and grilles afford a wide range of multiple deflection for air conditioning, ventilating, or cooling systems. They provide correct diffusion for high velocity outlets. Both the design of the bars and method of mounting them are unique. Bars are hollow moulded, beveled, perfectly formed, and smooth in contour. They are pivoted in the frame on special split sleeves, or expansion inserts, which furnish proper tension to hold bars firmly when set, yet allow easy adjustment to the desired angle with one simple tool. Bars are shaped like an airplane wing. They are pivoted in the exact center of each bar, so that for either return or supply, each bar can be completely turned around. For outlets, many users prefer to turn the thin edge to the front, and the broader edge toward the flow of air, thus taking advantage of a basic theory of aerodynamics, and reducing resistance and turbulence to a minimum. Bars may be set at any angle, in any grouping. Shutters of multi-louvre valves are pivoted on rivets to prevent vibration. All Streamliner registers are equipped with gaskets. In beauty, efficiency, and cost Streamliner registers are your logical choice for high velocity outlets. Write for Folder S-49 with sizes and list prices.

8 Models to Choose from

The Series includes models with single bank of adjustable bars (vertical or horizontal), also with double bank of adjustable bars (vertical in front and horizontal in back, or the reverse), also all above four types with the addition of horizontal multi-louvre valves in the rear, controlled by lever on face of register.

•

Auer's full line of registers and returns for air conditioning or gravity systems is shown in Auer Register Book, sent on request. For perforated Grilles, ask for Catalog "G".

THE AUER REGISTER CO., 3608 PAYNE AVENUE, CLEVELAND 14, OHIO
Canadian Distributor, Marchand Furnace, Ltd., Tilbury, Ont.

Auer REGISTERS
& GRILLES *for* AIR CONDITIONING & GRAVITY

YOUR PROBLEMS

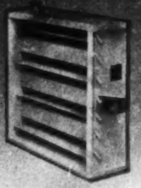
◆◆ if those problems can be solved

REVOLVING UNIT HEATERS
Design No. 8

The entire lower part (the discharge outlets) revolves slowly to distribute the comfortably warmed air over entire area. Machinery, merchandise, etc., cannot obstruct constantly moving air stream as they may with single-direction air stream from fixed discharge heaters. Design illustrated is for very high ceilings as in foundries, mills, factories.

TURBINE REVOLVING UNIT HEATERS

In this newest of Wing Unit Heaters, the steam to be used for heating is first used to drive the fan, thus eliminating motors. The fan is driven by the new Wing Allsteel Steam Turbine which operates at any pressure. There is no back pressure on the turbine, no need for packing, traps or extra piping. Has revolving discharge outlet for any height of ceiling.

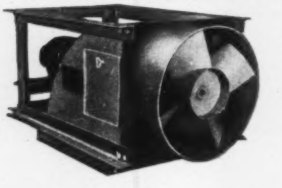


VARIABLE TEMPERATURE HEATER SECTION

Positively will not freeze because entire element is always under full steam pressure. Temperature control not obtained by steam throttling, but heating surface is divided into several narrow divisions with by-passes between. In front of each division and by-pass is a damper. Regulating positioning of dampers controls delivered air temperature.

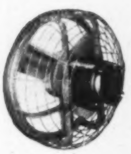
DUCT FANS
Straight Line Type

Designed to form a part of any straight run of duct. The motor is mounted on an adjustable base outside of the housing. V-belt drive is through an air tube carried across the housing and supporting fan shaft and bearings. Fan wheel is the new, non-overloading Wingfoil Fan. Bearings are grease-sealed, requiring minimum of attention.



DUCT FANS
Elbow Type

Designed to form an elbow in the duct system, the elbow-shaped housing, in a strong rectangular frame, permits installation with the inlet in any desired position. Motor and drive are outside the air stream, therefore remain cool, clean, and easily accessible. The new Wingfoil Fan has a remarkable "non-overloading" characteristic. Sizes 10" to 60"; capacities up to 60,000 CFM.



SAFETY VENTILATING FANS

Distinguished for efficiency and rugged construction. The new Wingfoil fan wheel moves maximum volumes of air with minimum horsepower, due largely to its non-overloading feature. Sizes from 10" to 60" dia., with free air capacities from 860 to 58,000 CFM. Larger sizes on special order. Either direct or belt drive. Heavy steel guards provide safety.

Wing

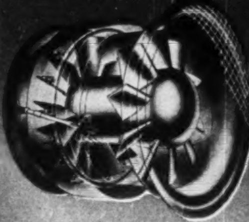
Unit Heaters
Ventilating Fans

L. J. Wing Mfg. Co.

14th St. & 7th Ave., New York 11, N. Y.

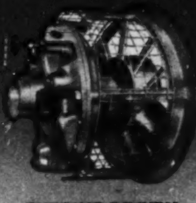
TAKE WINGS!

by any of the following equipment



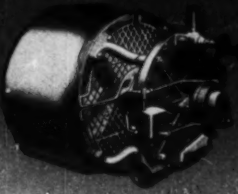
MOTOR-DRIVEN BLOWERS
Type EMD

For oil or gas burners, stokers, pulverized fuel and hand-fired boilers. Vertical or horizontal mountings; on floor or on wind boxes or air heaters. For statics up to 10 in., volumes up to 50,000 CFM. Manual or automatic capacity variation. Falling horse-power characteristics with dampering. Static efficiencies up to 80%.



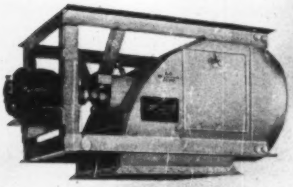
TURBINE-DRIVEN BLOWERS
Type R

Easily installed on burner fronts or boiler settings, providing precise-draft control, manually or automatically, eliminating duct work and large space requirements. Particularly adapted for plants where oil-free exhaust steam is available. Negligible operating cost, as most of heat from steam is recovered.



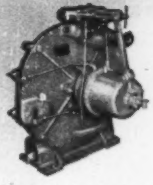
***Type K Turbine* BLOWERS**

The granddaddy of all Turbine Blowers. Standard since 1903. For forced draft by bricking into boiler wall settings at side, rear or front. Capacities up to 50,000 CFM and statics to 15 in. Mere turn of steam valve, manually or automatically, varies the speed and capacity. Oil-free exhaust steam permits economical utilization in feed water, process and heating systems.



FURNACE DRAFT INDUCERS

Assure positive draft at all times regardless of weather conditions, or of inadequate chimney or breeching construction. Even, constant suction. Insures boiler operation at maximum capacity and efficiency. May be installed directly in flue or in the breeching. For oil, gas, stokered or hand-fired boilers, high-pressure steam plants, or marine boilers.



STEAM TURBINES

Used for driving fans, pumps, generators, stokers, etc.

Ranges:	*Standard*	*Hi-Press.*
Max. BHP	100	150
Max. Temp.	525°F.	750°F.
Max. Pressure	275 lbs.	600 lbs.
Back Press. to	50 lbs.	50 lbs.
Speeds, up to	4000 RPM	4000 RPM

Horizontal or vertical shaft designs. Clockwise or counter-clockwise. Oil-free exhaust steam for heating and process work.

TURBINE DRIVE WINGFOIL FANS

As shown in the Elbow Type Duct Fan illustrated on opposite page, any Wingfoil Fan can be furnished with turbine drive. There are many advantages to turbine drive; for example, on shipboard where electrical output is often limited. But it is especially attractive where precaution must be taken against explosions—where the fan is handling explosive vapors, dust, powder, etc.

L. J. Wing Mfg. Co., 14th St. & 7th Ave., New York 11, N. Y.

Please send me the catalogs checked below:

☐ Motor Revol. Unit Htrs.
☐ Turbine Revol. Htrs.
☐ Var. Temp. Htrs.
☐ Motor Driven Blowers
☐ Turbine Blowers
☐ Steam Turbines
☐ Draft Inducers
☐ Ventilating Fans
☐ Turbine Fans
☐ Duct Fans

Name __________

Firm __________

Address __________

City __________ *Zone* ______ *State* ______

Wing

Turbines • Blowers
Draft Inducers

See the NEW 1950 MODELS

TYPHOON

AIR CONDITIONING UNITS

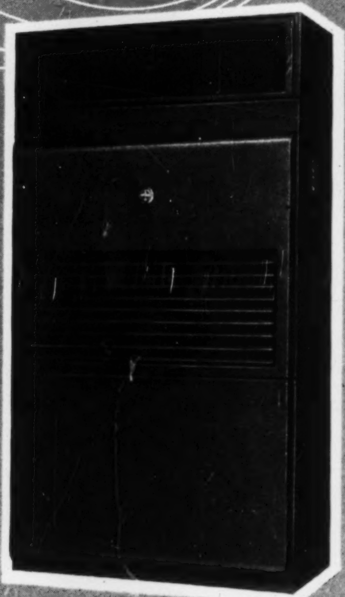
World's Most Complete Line of Packaged Air Conditioners

1½ · 2 · 3 · 5 · 7 · 10 · 15 · 20 Ton Sizes

—and a complete new sales promotion plan for you

BOOTH NOS.
623 · 625

Southwest Air Conditioning Exposition
STATE FAIR GROUNDS · DALLAS
JANUARY 23-27, 1950



- EVAPORATIVE CONDENSERS
- COMPRESSORS
- HIGH SIDE UNITS
- AIR CONDITIONERS

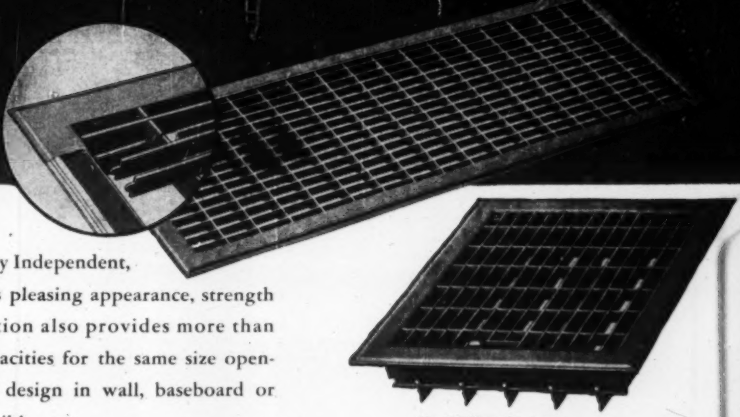
TYPHOON AIR CONDITIONING CO., INC., 794 Union St., Brooklyn 15, N. Y.

1909 — 40th Anniversary — 1949

INDEPENDENT *"Fabrikated"*

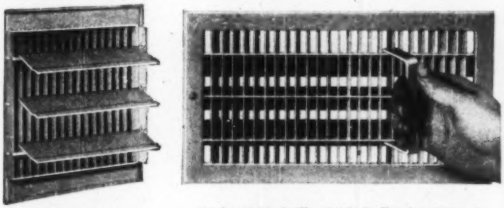
Reg. U. S. Pat. Off.

AIR CONDITIONING REGISTERS AND GRILLES



No. 32 Floor Register

"Fabrikated" construction, originated by Independent, has met wide acceptance because of its pleasing appearance, strength and rigidity. "Fabrikated" construction also provides more than usual free area, furnishing greater capacities for the same size opening. At the same time uniformity of design in wall, baseboard or floor registers and grilles is now possible.



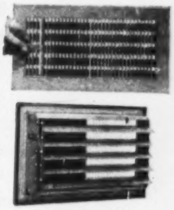
Style 321A Grille (With Deflecting Vanes)

INDEPENDENT *"Fabrikated"* WALL GRILLES

With Deflecting Vanes Provide 4-Way Air Flow

Compound deflections of air flows can be achieved with accuracy and certainty either at installation or any time afterward to meet changed conditions. Furnished with vertical grille bars and horizontal deflecting vanes or with horizontal grille bars and vertical deflecting vanes. Practically any size in even inches. These same grilles are supplied without deflecting vanes to provide 2-way air flow.

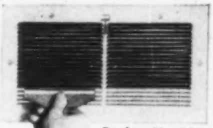
INDEPENDENT WROUGHT STEEL AIR CONDITIONING REGISTERS



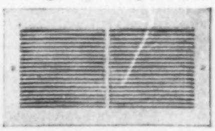
Design No. 238

Vertical grille bars are manufactured at an angle of 30 degrees, one half to the right, one half to the left. They may be bent straight outward or to direct air flow at any other right or left angle. Multiple valves at the rear can be set to deflect air flow up, down, straight out, or for complete closure. Made for baseboard or wall installation.

INDEPENDENT WROUGHT STEEL REGISTERS



Design No. 139



Design No. 39-WG

These registers do not compete with "Fabrikated." They comprise a high grade line of air conditioning registers of attractive appearance which are desirable for lower priced installations. Made in both wall and baseboard types.

Independent
GRILLES
THE INDEPENDENT REGISTER CO

WRITE FOR COMPLETE CATALOG No. 48

Always Leading . . . Always Progressing

THE INDEPENDENT REGISTER CO.

3747 East 93rd Street, Cleveland 5, Ohio

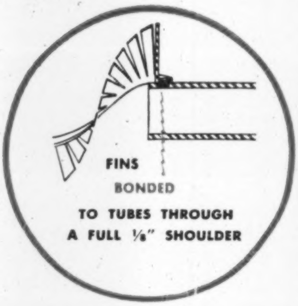
engineers
select
TILCO FIN
TUBING

for

Blast Coils, Cooling Coils, Unit Heaters, Direct Expansion Refrigeration Units, Central Plant Heating and Cooling Systems, Condenser Tubes, Evaporator Tubes, Air Conditioning and Dehydration Units and Systems, and for many other types of heating or cooling equipment

because

● **HIGH PERFORMANCE** *results from the segmented fin design and the Metallic Bond*



FLEXIBLE ● APPLICATION

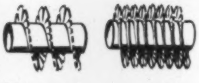
Steel fins can be welded to Steel tubes

Monel fins can be welded to Steel tubes

Steel fins can be welded to Cupro-nickel

Copper fins can be solder bonded to Copper tubes

▶ Fins may be spaced as wide as three rows per inch or as close as eight rows per inch



▶ Fins may be any desired height starting with ¼"

▶ Tubes can be as small as ⅜" in diameter or as large as 6" in diameter

● **LOW PRESSURE DROP** results from thin fins and clear passage over the fins

Suitable designs of narrow strip fins (⅛" wide) provide an increase of over 2 to 1 ratio in the heat transfer co-efficient compared to continuous fins.

FOR FURTHER INFORMATION WRITE TO:

DAVID E. KENNEDY, INC.
TILCO-FIN TUBING
58 Second Ave., Brooklyn 15, N. Y.

View of top of tower, showing fan guards

Air inlet louvres shown in photo are heavy 1" x 8" California Redwood.

HIDDEN COOLING TOWER

Preserves Building Appearance; Still Does Its Job

To look at it you'd never believe there's a water cooling tower serving the air conditioning system for this modern pharmaceutical plant. Even after a second look, you won't find it because it is "camouflaged" into the very top of the building itself. The tower is ruggedly constructed of Construction Heart Grade of California Redwood with an outer casing of brick to match the building's architecture. This cooling tower carries the same guarantees as any other C. H. W. tower, including guaranteed fan horsepower and guaranteed water cooling performance—and yet with a harmonizing casing for appearance as well as safety to meet city fire regulations. When you need a cooling tower for air conditioning or any other application, consult C. H. Wheeler for a custom-built job. Write for descriptive literature.

C. H. WHEELER MANUFACTURING CO.
1826 Sedgley Avenue, Philadelphia 32, Pa.
REPRESENTATIVES IN MOST PRINCIPAL CITIES

SINCE 1903

This C. H. Wheeler water cooling tower serves the air conditioning system installed in the new plant of the Smith, Kline and French Laboratories, Philadelphia, Pa. Responsible for this new building and its air conditioning system were The Ballinger Co., architects; Riggs, Distler & Co., Inc., contractors; and Barclay, White & Co., builders. Carrier Corp. furnished the refrigeration machinery.

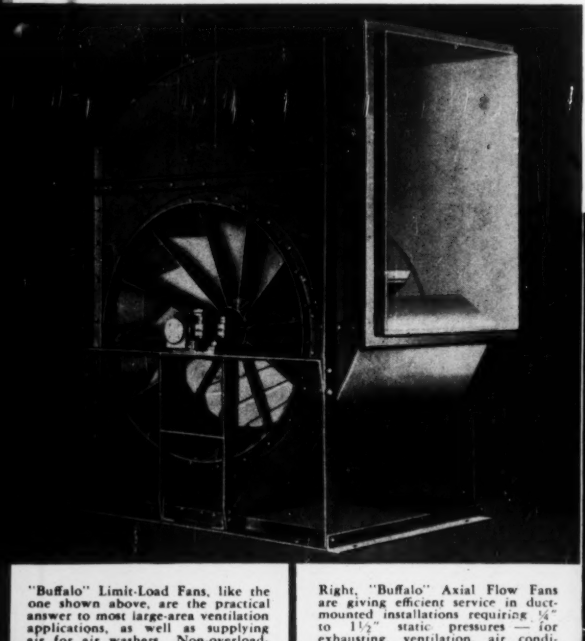
C. H. Wheeler

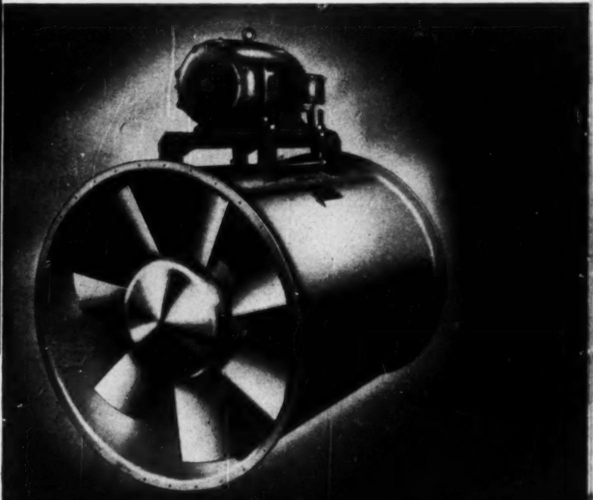
STEAM CONDENSERS • WATER COOLING TOWERS
EJECTORS • STEAM JET VACUUM REFRIGERATION
OF PHILADELPHIA

"Buffalo" for AIR

EVERYTHING YOU NEED

- In Heating
- In Ventilating
- In Cooling
- In Blowing
- In Exhausting
- In Air Washing
- In Comfort Conditioning
- In Humidity Control
- In Mechanical Draft





"Buffalo" Limit-Load Fans, like the one shown above, are the practical answer to most large-area ventilation applications, as well as supplying air for air washers. Non-overloading, quiet and high in efficiency.

WRITE FOR BULLETIN 3675.

Right, "Buffalo" Axial Flow Fans are giving efficient service in duct-mounted installations requiring ¼" to 1½" static pressures — for exhausting, ventilation, air conditioning service or boosting an existing system. Exceptionally light and compact.

WRITE FOR BULLETIN 3533-C.

HANDLING-

The Equipment YOU CAN DEPEND ON TO DO A GOOD JOB

HERE'S a convenience for anyone whose job is buying or specifying air handling equipment. Whatever the job, you will find the unit to handle it, simply by looking into the complete "Buffalo" line. For here, you'll find every type of fan—comfort conditioning cabinets in the sizes and models you want—heaters—evaporative coolers and condensers—air washers with or without complete air conditioning facilities.

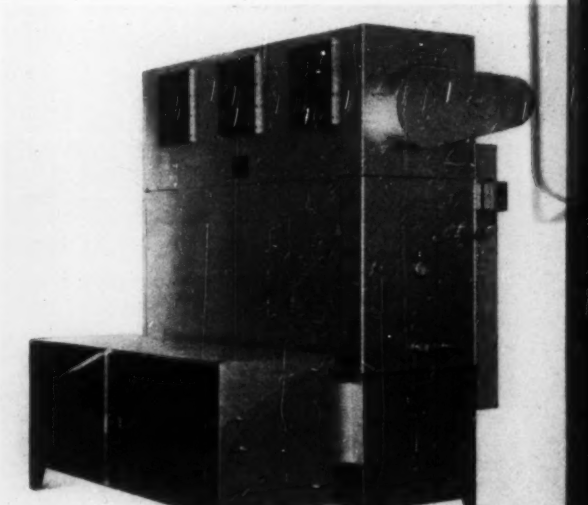
And no worry about performance! "Buffalo" equipment on the job industry-wide assures you of that. The "Buffalo" 72-year reputation for "air know-how" is further assurance to back your choice. Many "Buffalo" Air Washers are still functioning efficiently after more than 40 years of service—and many "Buffalo" fans are actively serving after more than 50 years.

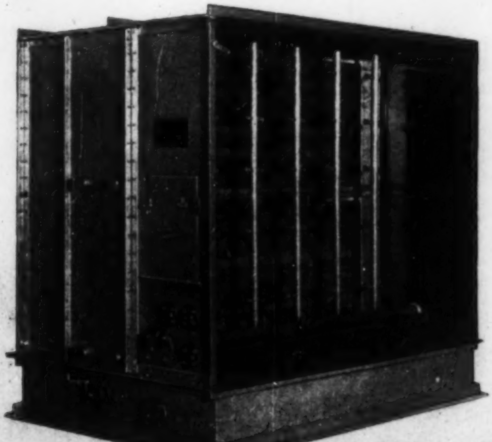
You can depend on "Buffalo" equipment to do the work "to specifications." And you can pick the RIGHT equipment EASILY from this unusually complete line. Simply write us NOW concerning any job you have for air.

BUFFALO FORGE COMPANY

171 MORTIMER STREET BUFFALO, N. Y.
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

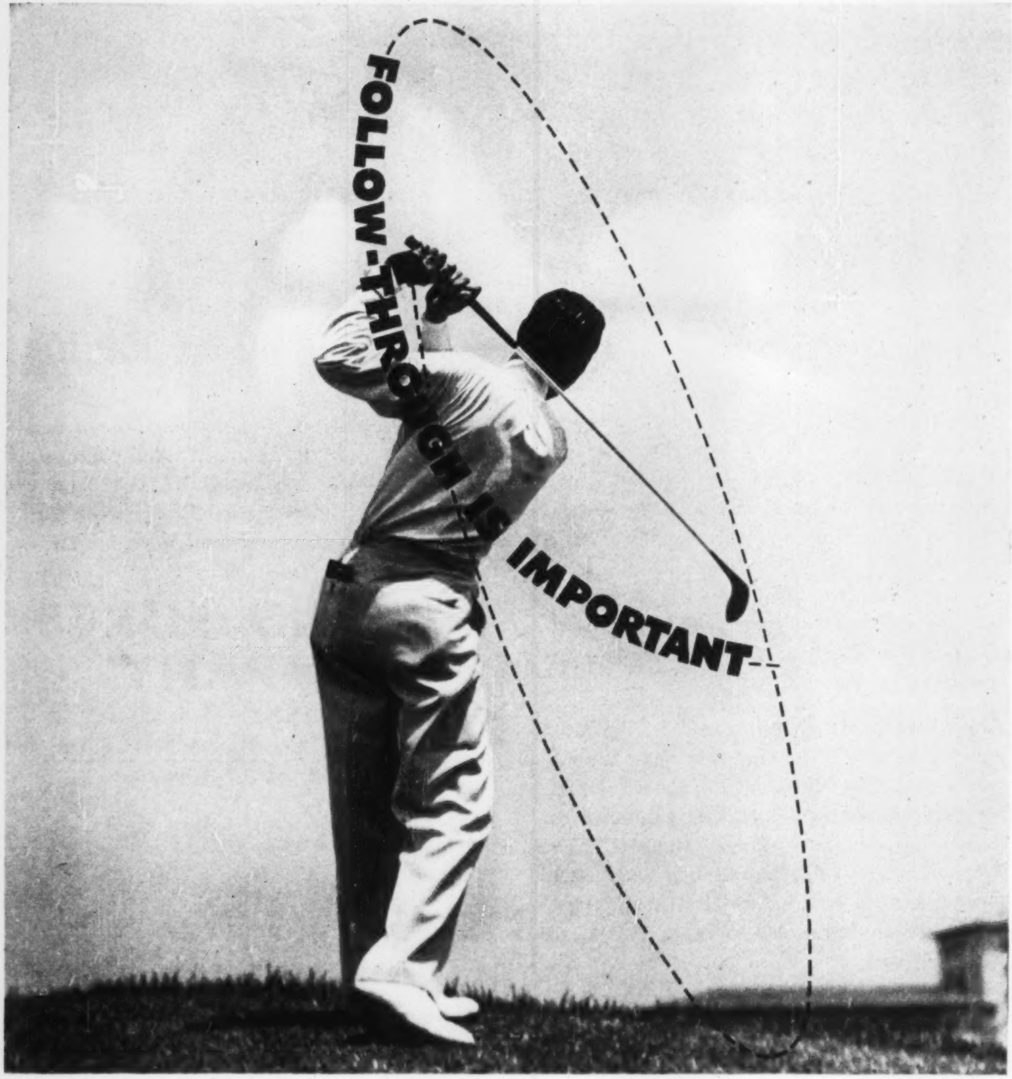
Branch Offices in All Principal Cities





Left, "Buffalo" Air Washers combine a half-century of improvements on the original basic "Buffalo" design. They are now more practical than ever for installation and operation. Complete choice of models for any desired combination of air conditioning. Write for BULLETIN 3142-D.

Above, "Buffalo" PC Cabinets provide complete central-station air conditioning in compact, easy-to-handle units. 3-section construction simplifies installation. Recent redesigning of these units includes hollow-shaft all-aluminum fans, which are more quiet and efficient than ever before. For complete data, write for BULLETIN 3703.



A good set of clubs and proper instruction will help your game, but without follow-through on that swing you'll never break a hundred.

Follow-through is important in air conditioning, too. Carrier engineers have years of experience and know-how behind them. And follow-through on every installation has helped to make Carrier the leader in air conditioning.

Carrier offices are located in most major cities and are ready to give prompt assistance, from planning the installation to making sure that it gives your customer dependable, low-cost service. The Carrier name is accepted everywhere as synonymous with efficient, economical air conditioning.

Carrier offers the most complete selection of air conditioning equipment on the market. For multi-room installations there are the Weathermaster systems, which provide year-round individual control of each room. For other installations there are Carrier Weathermaker units, central air conditioners, as well as a complete line of refrigerating machines. The name "Carrier" stands for the finest engineering and the finest equipment money can buy. Carrier Corporation, Syracuse, New York.

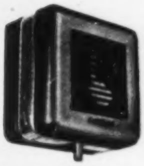
Carrier

AIR CONDITIONING

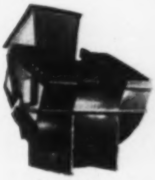
REFRIGERATION • INDUSTRIAL HEATING

American Blower—a time-honored name in air handling

In Houston, as in other cities, American Blower Air Handling Products have been serving commerce, industry and public utilities for over half a century. For air handling data in the Houston area, call American Blower—Preston 6171. In other areas, consult your phone book.



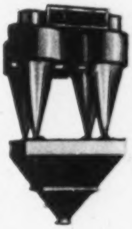
Venturafin Unit Heaters



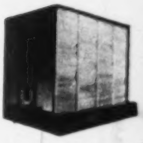
Mechanical Draft Fans

Utility Sets

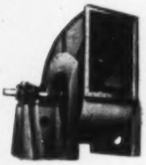
Ventura Ventilating Fans



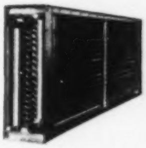
Dust Collectors



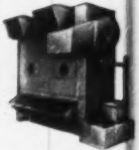
Air Washers



Industrial Fans



Heating and Cooling Coils



Air Conditioning Equipment

All air handling equipment is not alike. There's a vast difference in quality, design, quietness, operating costs and efficiency. Look before you buy and you'll buy American Blower products—the accepted quality standard, and proved in test after test by buyers.

Air is free . . . use it profitably!

MEN IN business know the importance of air in process work and as a sure means of improving both working and selling conditions.

They know, too, the finest air handling equipment money can buy is, in the long run, their best investment.

Building better air handling equipment for America's commerce, industry and public utilities has been American Blower's business since 1881.

Out of the thousands of applications of American Blower drying, ventilating, dust collecting, air conditioning and air handling equipment has come vital technical data and firsthand experience that you can profit by in your business.

If you would like to know how American Blower equipment can be applied profitably to your business, or how you as a contractor can apply it profitably to business and industry, phone the nearest American Blower Branch Office.

AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN
CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO

Division of American Radiator & Standard Sanitary corporation

YOUR BEST BUY

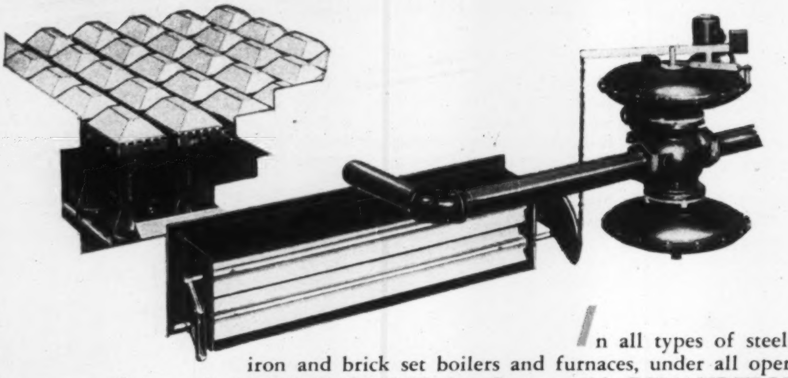
AMERICAN BLOWER

AIR HANDLING EQUIPMENT

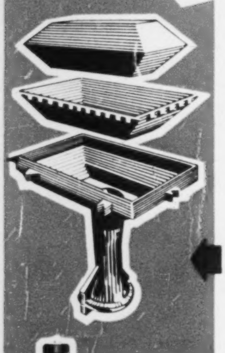
Serving home and industry

AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILERS • ROSS HEATER • TONAWANDA IRON

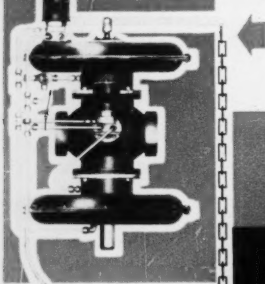
for highest efficiency from boilers . . . the TRULIRADIANT gas burner with DEMANDTROL



In all types of steel, cast iron and brick set boilers and furnaces, under all operating conditions, the TRULIRADIANT Gas Burner with DEMANDTROL has proved its outstanding efficiency. Its many unique features — short, silent, efficient interlaced 45° flame . . . clog-proof burner ports and venturi . . . "emerald-shape" insulfractories . . . integral-pilot burners . . . DEMANDTROL flexible two-stage firing with constantly matched secondary air supply . . . provision for use of outdoor thermostat — are integrated elements of a gas combustion unit that comes close to perfection in its efficient, economical performance.



Check the simple, three-part construction of the TRULIRADIANT Burner; insulfractory, port cap, and venturi. Here is a burner designed for long, useful life in heavy-duty service — for minimum attention and upkeep, and highest combustion efficiency.



With DEMANDTROL on the job, your gas burner will always operate at its most efficient stage . . . at "High fire" for peak demands, and thrifty "Low fire" when demands are less. Under all firing conditions, DEMANDTROL accurately meters the amount of secondary air admitted to the firebox. It minimizes draft losses and maintains the correct ratio of air to fuel for most nearly perfect combustion.

COMBUSTION ENGINEERING

Gold Top Heating Inc.

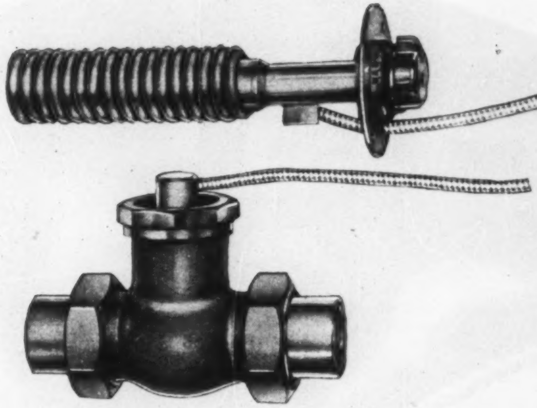
1400 E. SECOND ST. • BUTTE, MONTANA

EASTERN MANUFACTURERS AND REPRESENTATIVES

Gordon & Piatt

P. O. BOX 331 • WINFIELD, KANSAS

Try this for sighs...



OF COMFORT!

THE Sylphon Temperature Regulator pictured here is just one of our line of "comfort controls". It maintains temperature just as wanted—economically and reliably. It's typical of the Sylphon Regulators doing that job day after day in buildings of all sizes and types.

And see how carefully they're made, for dependable operation. Regulator 928-C (shown above) is especially suited for modulating control of air temperatures in ducts. Its bulb is constructed of numerous coils of copper tubing . . . is sensitive to slightest temperature changes.

Its packless valve eliminates service problems. There's no exposed operating mechanism. It is ideal for installation in ordinarily "hard-to-get-at" locations.

928-C is self-contained, self-powered, accurate, easily adjusted. Compact and rugged, it's built for long life and maintenance-free service. Connecting tube length as required.

Write for complete details. Ask for Catalog AH-50. Or ask about other Sylphon Regulators that are widely used for heating or ventilating.

FS

FIRST WITH BELLOWS

Temperature Controls • Bellows Devices • Bellows Assemblies

FULTON SYLPHON
DIVISION

ROBERTSHAW-FULTON CONTROLS CO., KNOXVILLE 4, TENN.

They all add up

Whenever you're in the market for equipment that will do things to temperatures, chances are there is a combination of Trane products that will meet your needs.

Your temperature problem may be associated with human comfort or industrial process; with solids, liquids, or gases. You may want temperatures high for heating or temperatures low for cooling, in home, commerce, or industry.

Select the individual items you need for your particular temperature problem, and you'll find they all add up to an efficient, smoothly operating system.

That's because all Trane products fit into a definite, sharply defined pattern. They are all designed together and built together for use together.

This unified line of interrelated products makes us an organization of specialists. Our 2000 workers in factory and field devote all their time to the production and application of equipment for heating, air conditioning, and other forms of heat exchange.

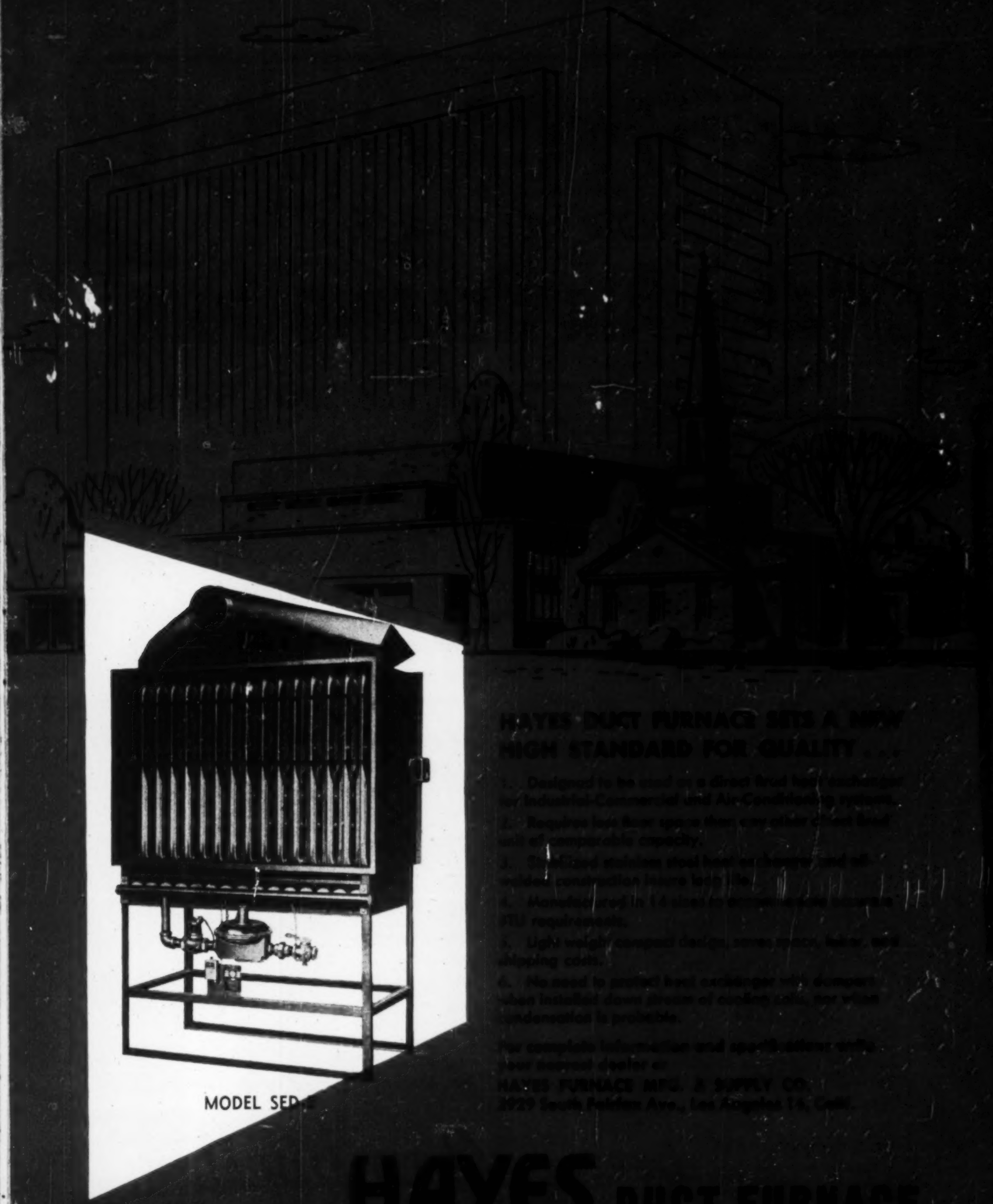
When the Trane Development Committee evaluates proposed new products, decisions are based not merely on "would it be profitable" but, rather, on "does it fit the Trane pattern?"

In other words, *does it add up?*

This sort of specialization has been going on for years and years and years. Trane and Temperature are becoming synonymous. It's good for us, and good for you, too. We'll prove it—at the drop of a postcard.

THE TRANE COMPANY . . . LA CROSSE, WIS.
EASTERN MANUFACTURING DIVISION, SCRANTON, PA.
Manufacturing Engineers of Heating, Ventilating and Air Conditioning Equipment—Unit Heaters, Convector-radiators, Heating and Cooling Coils, Fans, Compressors, Air Conditioners, Unit Ventilators, Special Heat Exchange Equipment, Steam and Hot Water Heating Specialties . . . IN CANADA, TRANE COMPANY OF CANADA, LTD., TORONTO.

Multi-Zone Air Conditioners
Self Cont. Air Conditioners
Custom-Air Conditioners
UniTrane Air Conditioning
Climate Changers
Brazed Aluminum Heat Exch.
Convectors
Cooling Coils
Heating Coils
Evaporative Condensers
Evaporative Coolers
Centrifugal Fans
Propeller Fans
Hot Water Specialties
Circulating Pumps
Booster Pumps
Condensation Pumps
Turbo Vacuum Compressors
Compressor Units
Condensing Units
Dry Expansion Chillers
Shell & Tube Heat Exchangers
Steam Heating Specialties
Railway Air Conditioning
Railway Heating Systems
Bus Air Conditioning
Bus Heating Systems
Propeller Unit Heaters
Blower Type Unit Heaters
Unit Ventilators
Roof Ventilators
Wall Fin Heaters
Product Coolers
Radio Tube Coolers
Air Washers
Fluid Coolers
Diesel Engine Coolers
Dry Condensers
Transformer Oil Coolers
Process Heat Exchangers



MODEL SED-5

HAYES DUCT FURNACE SETS A NEW HIGH STANDARD FOR QUALITY . . .

1. Designed to be used as a direct fired heat exchanger for Industrial-Commercial and Air-Conditioning systems.

2. Requires less floor space than any other direct fired unit of comparable capacity.

3. Stabilized stainless steel heat exchanger, and all-welded construction insure long life.

4. Manufactured in 14 sizes to accommodate accurate BTU requirements.

5. Light weight, compact design, saves space, labor, and shipping costs.

6. No need to protect heat exchanger with dampers when installed down stream of cooling coils, nor when condensation is probable.

For complete information and specifications write your nearest dealer or
HAYES FURNACE MFG. & SUPPLY CO.
2929 South Fairfax Ave., Los Angeles 16, Calif.

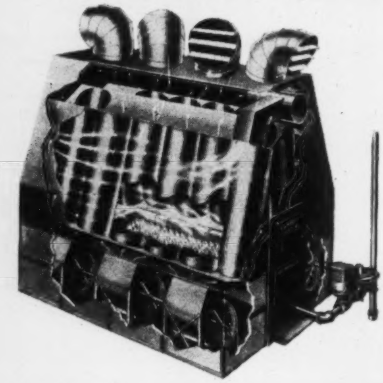
HAYES DUCT FURNACE

BOYD ENGINEERING CO., 123 W. Granite, Albuquerque, New Mexico • BUMGOLD & CO., 379 Nelson Street, Atlanta, Georgia • BOOGHER-HARBECK CO., 2021 Cedar Springs, Dallas, Texas • HARRY NEUMANN, 1228 California Street, Denver, Colorado • BOYD ENGINEERING CO., 718 No. Stanton St., El Paso, Texas • W. L. LASHLEY CO., 830 Pacific St., Houston, Texas • SMITH STEAM SPECIALTY CO., 2110 Temple Bldg., Kansas City, Missouri • J. C. LEWIS, Pyramid Building, Little Rock, Arkansas • J. M. O'CONNOR CO., 1430 N. W. 5th, Oklahoma City, Oklahoma • MIDGLEY-HUBER, 44 W. Eighth South St., Salt Lake City, Utah • D. E. SHIPPY, 801 Frost Bank Building, San Antonio, Texas • [illegible], 27 [illegible] Street, San Francisco, Calif. • J. M. O'CONNOR CO., 2429 E. 11th, Tulsa, Oklahoma • J. M. O'CONNOR CO., 300 N. Water Ave., Wichita, Kansas
BOYD ENGINEERING CO., 18 South Third St., Phoenix, Arizona

Specify CAMPBELL

FOR ALL LARGE

WARM AIR HEATING JOBS

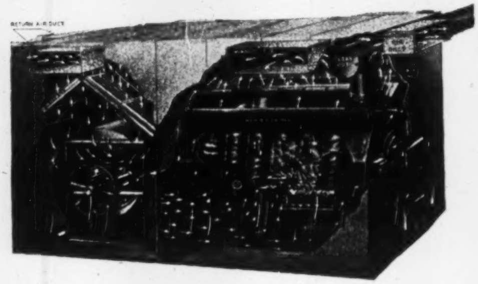


Direct-Fired Space Heaters

Campbell now offers a line of large, direct-fired space heaters for oil, gas and stoker firing, in capacities up to 2,160,000 BTUs per hour. Extremely large heating surface and extra heavy welded steel heater assure amazing fuel economy and long, dependable service. For customer satisfaction—for easy installation—investigate Campbell Direct Fired Space Heaters.

8000 Series Heaters

The ideal warm air heater for churches, theaters, schools and all large buildings. Available for all fuels. Delivers quick abundant heat with outstanding fuel economy. Large silent blower assures quick distribution of heat even with intricate duct systems in large multi-room structures. Easily adapted for summer air conditioning. Write for details on the 8000 Series.



SPECIAL UNITS FOR DRYING & PROCESSING

Take advantage of Campbell's experience in the design and construction of special units for all types of drying and processing.

We will be glad to submit our recommendations for a dryer to meet your specifications. Oil or gas fired; up to 14,000,000 BTUs.

WRITE:

Our engineering department will be glad to provide layouts, sketches or suggestions for any large warm air heating installation.

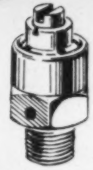
Campbell
HEATING COMPANY
Des Moines 17, Iowa

Every Campbell Heater backed by 65 Years Heating Experience

ROLL [illegible] DOLE

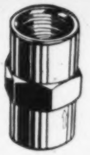
40 Fast Rolling Items

Get Details from Your Jobber



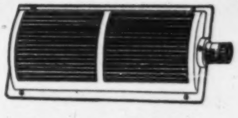
The NEW Thing in Hot Water Heating—

Dole No. 20 Hot Water Air Valve—*first fully automatic* vent for radiators and convectors. (In the new colored display packages.)



The VERSATILE New Flow Control

Just announced automatically gives constant flow regardless of water pressure. Great in tankless heaters. *New dealer display available.*

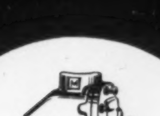


The BIG Thing in Forced Warm Air

Dole Thermostatic Air Controls balance systems—assure economy and individual room temperature control. (New low list price.)

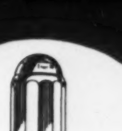
CONTROL with DOLE

Plus the COMPLETE Line of 36 DOLE AIR and VACUUM VALVES etc.



The UNIQUE Mixer for Hot and Cold Water

Control temperatures from domestic hot water heaters—more usable hot water.



The SURE Thing in One-Pipe Steam

Fully proved on many thousands of radiators, Dole No. 1A Vari-Vents balance systems, lower heating costs.

[illegible]

THE DOLE VALVE COMPANY • [illegible]

Zallea Expansion Joint News

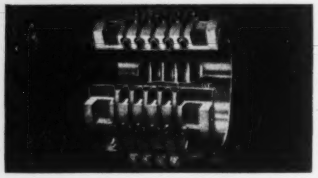
PUBLISHED BY ZALLEA BROTHERS—WORLD'S LARGEST MANUFACTURERS OF EXPANSION JOINTS EXCLUSIVELY

Expansion Joint of the Month

PROTECTING $100,000 A DAY

DUO EQUALIZING TYPE

The ideal corrugated expansion joint is one in which all corrugations move simultaneously during expansion or contraction of the piping, and no corrugation can be compressed or extended more than the proportionate amount for which it is designed. This briefly describes the Zallea Duo Equalizing Expansion Joint, so called because it functions in two ways: equalizing the compression among the corrugations simultaneously when the pipe line is expanding and likewise distributing the elongation simultaneously and proportionately among all the corrugations when the line is contracting.



This is accomplished by the simple expedient of a pantograph. Two or more pantographic chains are superimposed on the equalizing rings of the expansion joint, the neutral points being anchored in the end fittings and intermediate equalizing rings. Any movement of the end fitting is immediately and simultaneously transmitted to all equalizing rings. In this manner all the equalizing rings move the same relative distance at the same time. This Zallea Joint is recommended for all intermittent steam services in long lines, institutions, and industrial plants.

FIRST *of its* KIND!

". . . a complete, practical catalog on all Zallea Expansion Joints. A text book and a valuable reference source. Send for your *free* copy *today!*

ZALLEA BROTHERS, 816 Locust Street
Wilmington 99, Delaware.

Control in Manufacture

COPPER VS. STAINLESS STEEL

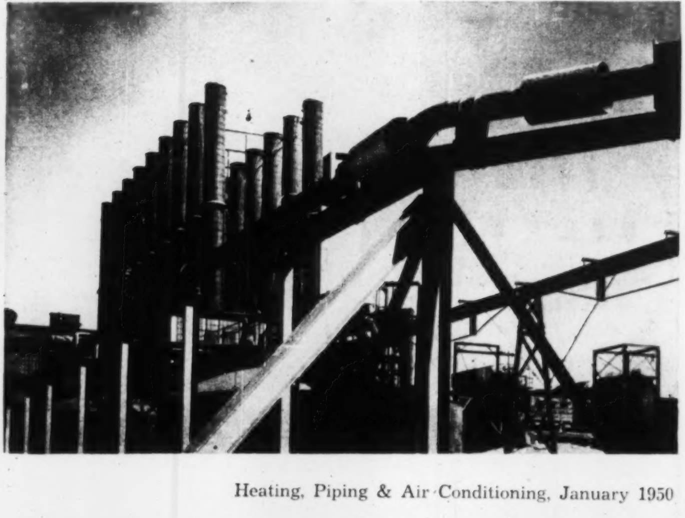
For many years, copper has been the accepted material for the corrugated elements of packless expansion joints for use on heating lines, pumps, turbines and condensers. However, with new expansion problems demanding higher strength and greater corrosion or temperature resistance, stainless steel has replaced copper in approximately 95% of the applications. Although slightly higher in initial cost, the use of stainless steel results in much lower final costs because of increased service life. Stainless steel corrugated elements can be made with a wall thickness approximately one-third of that required for copper to withstand the same working pressure. Since the life expectancy of a corrugated element varies inversely with the thickness of the metal, a stainless steel expansion joint will last many times longer than a copper expansion joint designed for the same operating pressure. The stainless steel used in the Zallea Expansion Joint may be of several alloys, depending upon temperature, corrosion and other service requirements.

ZALLEA EXPANSION JOINTS GUARD PLANT CAPACITY

At a large eastern industrial plant which has a production capacity of over $100,000 per day, Zallea Stainless Steel Expansion Joints serve as insurance against shutdown and costly delay. Failure of any one of the many expansion joints that are installed in the outdoor steam distribution line would result in major production loss. But the Zallea Joints installed here in 1933 still function safely and dependably. It's the *quality* built into every Zallea Expansion Joint that makes them last!

No Maintenance Required

Built expressly to absorb expansion and contraction of pipe lines due to thermal changes, Zallea Stainless Steel Expansion Joints will serve dependably and economically under the severest of installation operating conditions. There's no packing to deteriorate—no maintenance is required. For normal steam line operation, Zallea Stainless Steel Expansion Joints will outlast the line itself!



first

AND THE LAST WORD

in forged steel fittings for all industries . . .

CARBON STEEL

Low Sulphur, Low Phosphor
High Tensile, High Weldability

ALLOYS

Stainless types 304–316–347
Chrome Moly—Carbon Moly—
Chrome Carbon Moly—Monel
Special alloys for Low Temperatures

W-S on Forged Steel Fittings, produced in commercial quantities—has been and still is the last word in dependable, trouble-free screw end and socket weld fittings service for ALL INDUSTRIES. Here's Why:

Reflected in the manufacture of every W-S *Forged* Fitting is a specialized knowledge of its end use by a particular industry. Beginning with selection of the right material from a wide choice of carbon and chrome-alloy steels, each W-S *Forged Steel* Fitting is tailor-made for a specified application:

Is high temperature, high-pressure STRENGTH a problem? W-S has been supplying intermediate alloy fittings to the power industry for many years. Want CORROSION RESISTANCE? W-S provides a full range of the popular stainless grades for all chemical processing requirements. Need PROTECTION against contamination and discoloration? Many food and drug processing plants use W-S 18-8, type 304, for full assurance of SANITATION . . . have for years. Plagued by INTERRUPTED SERVICE due to fittings failure under conditions of shock, vibration, and erosion? Industry after industry . . . and commercial and institutional users as well . . . have discovered the long-range ECONOMY of forged, life-of-the-system joints, as compared to any other kind.

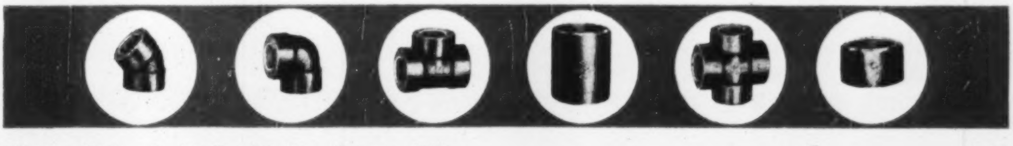
Be sure that you have the right answer to your next fittings problem . . . before it arises: write for W-S Bulletin A-3, today.

50A

WATSON-STILLMAN **ROSELLE, NEW JERSEY** W-S *Established 1848*

Designers and Manufacturers of Forged Steel Fittings, Valves, Wire Rope Shears, Hand Pumps, Jacks, Pipe Benders and Hydraulic Equipment

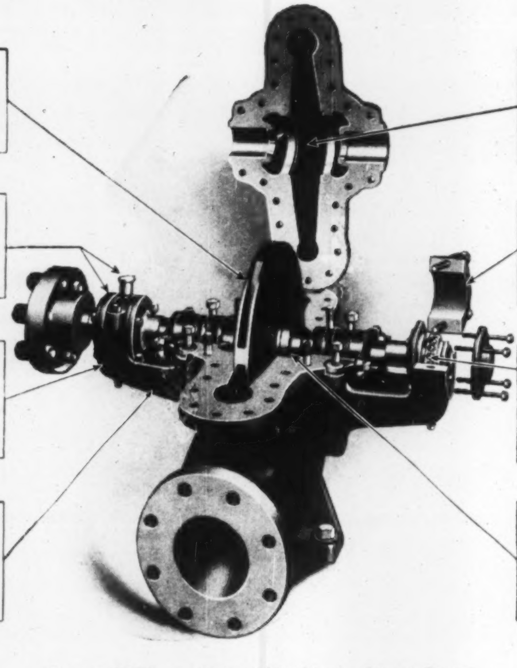
SOLD THROUGH LEADING DISTRIBUTORS



"CHICAGO" TYPE "D"

HEAVY DUTY

Building and Industrial Pump



Complete Bronze Fittings are standard: Impeller, wearing rings, glands, gland bolts, lock nuts, etc.

Oil is filtered before reaching ball bearing, and Felt Washers are provided to exclude dust, water and grit.

Bearing Brackets are cast integral with lower half of casing. This prevents misalignment of bearings, and allows a shorter sturdier pump.

Scientific Heat Treatment of castings insures against warped parts due to aging. (This same process is applied to automobile engine cylinders.)

"Waterseal" Passageway is cast into top casing at low-pressure point. Packing wear and leakage is reduced, and there is no external pipe to be broken.

Bearing Housings are accurately ground for interchangeability of bearings. Bearings may be replaced easily and economically.

Extra Large Deep Groove Radial Ball Bearings carry weight of moving parts, and thrust of impeller. They conserve power and economize on lubrication.

Keyway is provided in Impeller Hub to prevent turning on shaft. Bronze Lock Nuts on each side firmly hold impeller in position.

Figure E820 — Type "D" Single Stage Pump

Capacities from 25 to 1900 GPM — Heads up to 530 feet

Best Materials Available and Skilled Craftsmanship in Every Chicago Pump

CHICAGO PUMP COMPANY

BUILDING and INDUSTRIAL DIVISION

2300 WOLFRAM STREET

CHICAGO 18, ILLINOIS

Condo-Vac, Sure Return, AVC, LVC,
Fire, House & Circulating Pumps
Pneumatic & Tankless Water Systems

Flush-Kleen Sewage Ejectors
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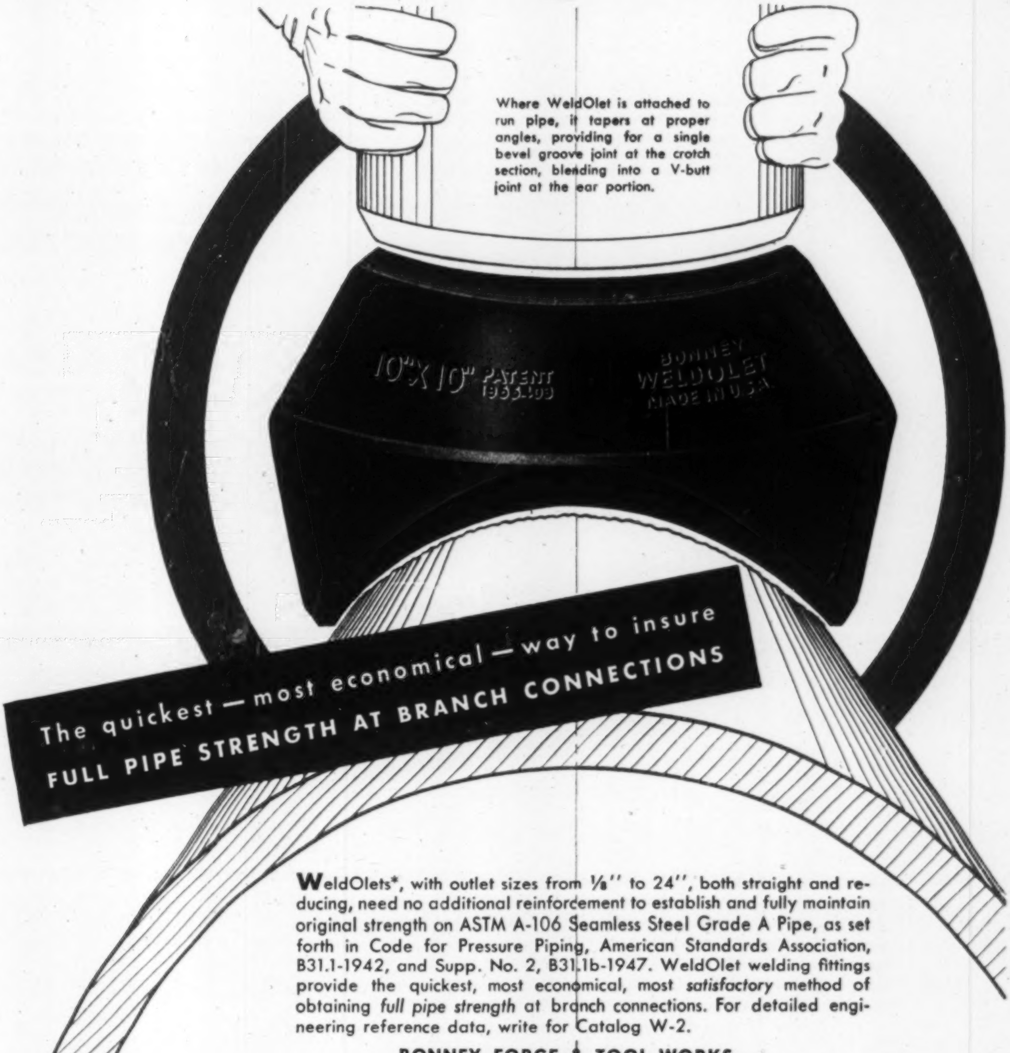
Pumps for every industrial use.



Where WeldOlet is attached to run pipe, it tapers at proper angles, providing for a single bevel groove joint at the crotch section, blending into a V-butt joint at the ear portion.

The quickest — most economical — way to insure
FULL PIPE STRENGTH AT BRANCH CONNECTIONS

WeldOlets*, with outlet sizes from 1/8" to 24", both straight and reducing, need no additional reinforcement to establish and fully maintain original strength on ASTM A-106 Seamless Steel Grade A Pipe, as set forth in Code for Pressure Piping, American Standards Association, B31.1-1942, and Supp. No. 2, B31.1b-1947. WeldOlet welding fittings provide the quickest, most economical, most *satisfactory* method of obtaining *full pipe strength* at branch connections. For detailed engineering reference data, write for Catalog W-2.

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FORGED FITTINGS DIVISION • 350 GREEN STREET • ALLENTOWN, PENNA.
Authorized Canadian Factory Representative: Sterling Steel Co., Ltd., 20 Temperance St., Toronto 1, Canada—1040 Sherbrook St., W., Montreal, Canada
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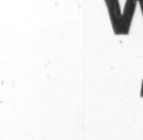


Fig. 1—Cut-away view of reducing size WeldOlet with welding outlet in place. The external rib and wide bases or footings of WeldOlets* eliminate the need for *extra supports* to take care of bending or vibrational stresses at crotch section, the point of greatest stress.

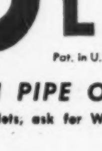


Fig. 2—Note blending of ear portion of welding fitting to run pipe. Extension of weld metal below inside scarfed portion of pipe insures all sections of joint greater than pipe wall thickness.

WELDOLETS

*Trade Mark Reg. U.S. Pat. Off.

Pat. in U.S. & Foreign Countries

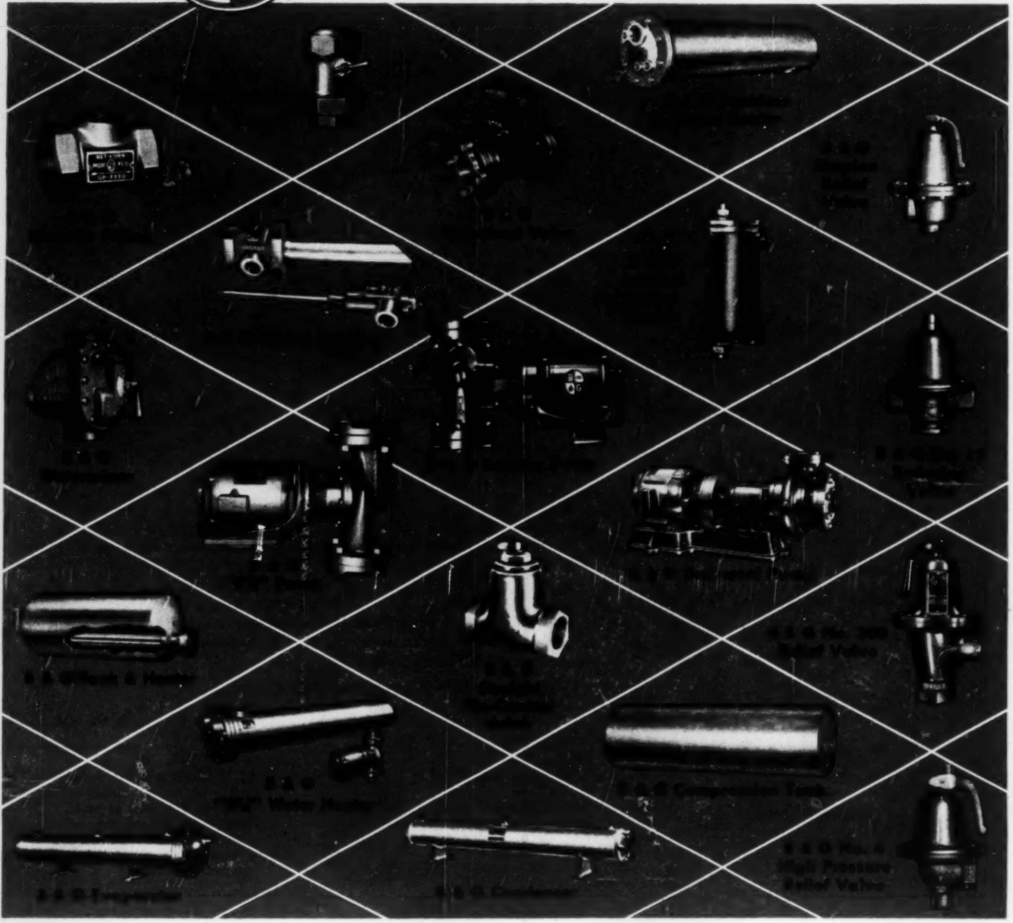
FOR WELDED BRANCH PIPE OUTLETS

When you want Bonney Welding Outlets, ask for WeldOlets*

THE LINE OF LEAST Sales RESISTANCE

Hydro-Flo* PRODUCTS

. . . MORE VALUE FOR YOUR DOLLAR


B & G Tank & Heater
B & G No. 300 Relief Valve
B & G Compression Tank
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B & G Condenser
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Makers of Forced Hot Water Heating Systems . . . Water Heaters . . . Heat Exchangers . . . Centrifugal Pumps . . . Refrigeration Equipment.

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METALFLO · LOCKSEAM · COIL STRIP AND SEAMLESS TUBING · TUBULAR PARTS

STAYNEW
PANEL FILTERS

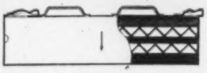
Dry-Type ★ Viscous-Type

designed for a broad range of prices and applications

Simple, efficient designs and rugged construction are featured. Most types provide for cell and frame assemblies, with heavy, serviceable handles and powerful cam-type locking latches. 18-gauge steel is used throughout. Supporting frames are so designed and drilled that they can be riveted together to form a flat bank. By the addition of angles, a series of "V's" can be formed. All models typify the high efficiency and low maintenance cost for which Staynew Filters have been famous since 1920.

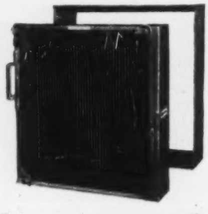
MODEL PVG VENTILATION FILTER . . .

● A low-cost, permanent, washable type filter. Designed for maximum use of medium with minimum of weight. Exclusive Staynew "RL" steel medium causes rapid changes in air direction and holds heavier particles. Finer particles are held by corrugated screen cloth and, as a final stage, layers of fine woven copper mesh. 2" and 4" units available.

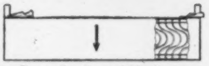


Cross Section of Medium

MODEL SPB SPRAY BOOTH FILTER . . .



DRY OR VISCOUS DEPENDING ON KIND OF PAINT USED. Removes paint spray particles from the ventilation air stream by means of a series of scientifically designed baffles. These baffles cause rapid changes in direction of air-flow and consequent impingement of particles, which collect and drain to the bottom of the unit.



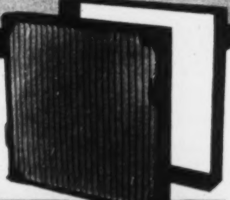
Cross Section of Medium

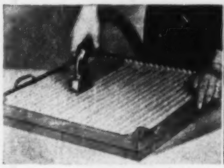
Representatives in Principal Cities

★

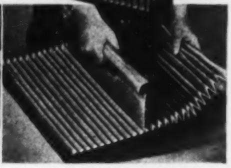
Write for Complete Data, Mentioning Special Interests

MODEL WKE VENTILATION FILTER . . .





Easy to clean by vacuum



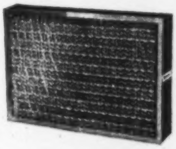
Filtering medium replaceable at low cost

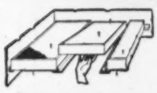
Especially designed for heavy duty industrial applications. "V" construction provides large filtering area in small space. Wide variety of media available. Cleaning simple and easy with Staynew Saddle-type Vacuum Cleaning Nozzle. 2" and 4" deep units available. Fire Underwriters Class I Approved when used with B-G Medium.

Staynew Vacuum Cleaning Nozzle

NEW! MODEL PVR KITCHEN RANGE FILTER

Solves the problem of grease collection in exhaust hoods over ranges, steam tables or cookers. Eliminates fire hazard and odorous, unsanitary conditions. Exclusive Staynew "RL" steel filtering medium. Available in 3" deep units. *Lowest cost high grade range filter.*





Panels easily removed for cleaning in hot, soapy water. Automatic dishwashing machine ideal for this purpose.

DOLLINGER PROTECTOMOTOR STAYNEW FILTERS

DOLLINGER CORPORATION, 9 Centre Pk., Rochester 3, N. Y.

OIC UNION BONNET BRONZE GATE VALVE

GIVES YOU MONEY-SAVING FEATURES YOU'LL WELCOME

This series of OIC valves (Figure nos. 7200, 7202 and 7208) is rated for working pressures of 200 pounds steam at 550°F.—400 pounds water, oil and gas, non-shock. Union bonnet screwed-end type. Solid wedge rising stem, double-disc rising stem and solid wedge non-rising stem designs. Tapered seats and wedges of OIC copper nickel alloy. You'll find this new valve a money-saver on water, oil, gas, steam or any other service where bronze gate valves are used.

LONGER LIFE—LOWER COST

Scientifically designed, constructed of highest quality materials, accurately machined and thoroughly tested for trouble-free operation.

EASILY SERVICED—LOWER MAINTENANCE

Easy to dismantle and reassemble. Quick inspection and servicing. Easy repacking.

EASIER OPERATION—SAVES TIME

Perfect seating without binding or undue wear. Straight-through flow. Minimum pressure drop.

STRONGER—GREATER SAFETY

Ample wall thicknesses. No dangerous stress concentrations. Leak-proof joints.

OIC

PACE SETTER IN VALVES

SPECIAL INTRODUCTORY OFFER

If you'd like to check this OIC bronze 200 lb. union bonnet gate valve, simply send us the size and we'll deliver you a sample on memo billing. Inspect it, analyze it, take it apart, test it. At the end of 30 days, if you're not convinced of its superiority over any comparable valve you've ever used, return it for full credit.

THE OHIO INJECTOR CO.
243 Main St. WADSWORTH, OHIO

BRONZE • IRON • CAST STEEL • FORGED STEEL

[illegible]-14

Moore INDUSTRIAL

VANEAXIAL FANS AND BLOWERS

QUIET – SLOW SPEED – DIRECT DRIVE – DEPENDABLE

42" VENTILATING FAN

MOORE fans quietly move large volumes of air. Rugged construction assures long life and maintenance-free service.

Slow speed, permanently greased ball bearing motor is rubber mounted in dirt proof hub.

Manufactured of steel for general applications, or of Monel Metal or Stainless Steel for corrosive fumes. Separate motor ventilation is provided when made for corrosive atmospheres. **WRITE FOR COMPLETE LITERATURE.**

VENTILATING FANS

For exhausting smoke, fumes, vapors, dust and for fresh air supply. Widely used by packing houses, paper mills, sugar refineries, textile mills, bleacheries, laundries, foundries, dairies and factories.

THE MOTOR IS IN THE HUB—IT'S DIRECT DRIVE

VENTILATING FAN SPECIFICATIONS
Series 16—(16" Hub)

STANDARD MODELS
¾ HP.—60 Cy.—3 Ph., 2 Ph., or 1 Ph.

Fan Diameter	Speed R.P.M.	No. of Blades	Air Del'y C.F.M.	List Price Steel
36"	375	12	11,000	$320.00
42"	375	5	15,000	340.00
48"	375	4	18,000	360.00
54"	375	4	21,000	380.00
60"	375	3	25,000	400.00

HIGH CAPACITY MODELS
1¼ HP.—60 Cy.—3 Ph., or 2 Ph.

Fan Diameter	Speed R.P.M.	No. of Blades	Air Del'y C.F.M.	List Price Steel
36"	570	5	15,000	$320.00
42"	570	4	18,000	340.00
48"	370	6	21,000	400.00
54"	370	6	25,000	420.00
60"	370	5	29,000	440.00

Capacities listed are for free air delivery

36" PRESSURE BLOWER

VANEAXIAL PRESSURE BLOWERS

THE MOTOR IS IN THE HUB—IT'S DIRECT DRIVE

MOORE pressure blowers are used in duct systems with filters and coils for industrial ventilation and other large industrial air moving applications. They are manufactured of steel, monel or stainless for corrosive atmospheres—Custom assembled without extra cost for maximum efficiency at volume and pressure desired.

The Specifications Listed Below Show Capacities for Various Sizes.

SERIES 16 PRESSURE BLOWERS (16" Hub)

BLOWER DIAMETER	SPEEDS RPM	MOTOR HP	NUMBER OF BLADES	VELOCITY FPM	VOLUME CFM	MAXIMUM TOTAL PRESSURE (VP + SP)
36"	380 to 1140	¾ to 15	2 to 8	1000 to 4300	6,000 to 25,000	2.80" wg.
42"	380 to 1140	¾ to 15	2 to 8	1000 to 3600	8,000 to 30,000	2.80" wg.
48"	380 to 1140	¾ to 15	2 to 8	1000 to 3600	11,000 to 40,000	2.80" wg.
54"	380 to 855	¾ to 11	2 to 8	1000 to 3100	14,000 to 45,000	1.60" wg.
60"	380 to 855	¾ to 11	2 to 8	1000 to 3000	18,000 to 55,000	1.60" wg.

SERIES 24 PRESSURE BLOWERS (24" Hub)

BLOWER DIAMETER	SPEEDS RPM	MOTOR HP	NUMBER OF BLADES	VELOCITY FPM	VOLUME CFM	MAXIMUM TOTAL PRESSURE (VP + SP)
48"	285 to 1140	4 to 60	2 to 8	1000 to 5700	9,000 to 55,000	4.25" wg.
54"	285 to 855	4 to 45	2 to 8	1000 to 4700	13,000 to 60,000	3.76" wg.
60"	285 to 855	4 to 45	2 to 8	1000 to 4600	16,000 to 75,000	3.76" wg.
72"	285 to 684	4 to 36	2 to 8	1000 to 3650	25,000 to 90,000	2.40" wg.
84"	285 to 570	4 to 32	2 to 8	1000 to 2900	35,000 to 100,000	1.60" wg.
96"	285 to 488	4 to 21	2 to 8	1000 to 2600	45,000 to 120,000	1.20" wg.

Above capacities are based on 70° standard air and 60 cycle speeds. Two or more blowers may be connected in tandem or series for higher pressures. Regular motor production includes 220, 440 and 550 volt, 60 cycle, 3 phase. Two-speed motors and other current characteristics available. Consult the nearest representative or write us direct and your inquiry will receive prompt attention.

THE *Moore* COMPANY

810 S. MISSOURI
MARCELINE, MO.

Representatives in Principal Cities. Some Territories Available.

more and better service
from R·P&C
VALVES

...here's One Reason Why:

Over 60 years ago,
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passed this resolution:

Resolved:

"That the superintendent
" shall be held responsible
" for the production of goods
"as near perfect in design,
" material and workmanship
"as shall make them merchantable
" and of a character that will serve
"to establish for this company
" a high reputation "

● This policy has remained unshaken through two world wars. The "high reputation" has been maintained. More than ever before, the valves offered by R·P&C meet the demand for longer and better service.

ACCO

Reading, Pa. • Atlanta • Baltimore • Boston • Chicago • Denver • Detroit • Houston
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R-P & C VALVE DIVISION
AMERICAN CHAIN & CABLE

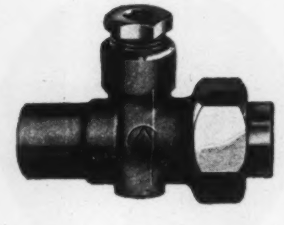
TRADE MARK

READING-PRATT & CADY VALVES

demand
DETROIT CERTIFIED VALVES and CONTROLS

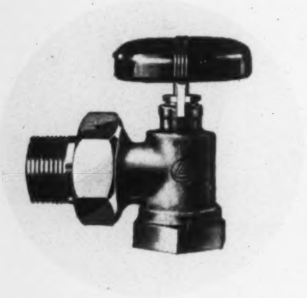
No. 334 Straightway Balancing Fitting—Double sweat connection type for copper pipe. For use with concealed or "convector" type radiators, it is available in ⅜", ½" and ¾" nominal copper pipe sizes. Cast brass body, sandblast finish. A full line of double sweat connection DETROIT Circulator Valves and Balancing Fittings is available.

➡



No. 102 Circulator Valve—Employs the swinging plate feature, which makes it self-cleaning and assures full flow. Cast brass body with sandblast finish. Made in ½" and ¾" sizes with threaded tail pipe. DETROIT Circulator Valves are available in angle and straight types in packed and packless models.

⬅

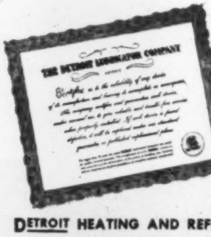


No. 233 Balancing Elbow—Sweat connection for copper pipe and threaded tail pipe for radiator connection. Made of cast brass, with sandblast finish, No. 233 is available in ⅜", ½" and ¾" nominal copper pipe sizes. DETROIT Circulator Valves and Balancing Fittings, with single sweat connection, are made in all types.

➡

For Every Valve or Fitting Problem
DETROIT
HAS THE BEST ANSWER!

It really pays to demand DETROIT valves and fittings—for DETROIT has the *best* for every need. Those shown above are representative of an entire line of superior valves and fittings—one of the most complete in the field. DETROIT valves and fittings are rugged in design and built to give years of dependable service. Each is backed by the DETROIT certification—your guarantee of product quality. Specify DETROIT now for *all* your needs. You'll find that having such a complete line of quality valves and fittings readily accessible at one reliable source will mean greater efficiency, economy and customer satisfaction.



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—only Authorized
DETROIT *Wholesalers*
sell certified Controls.

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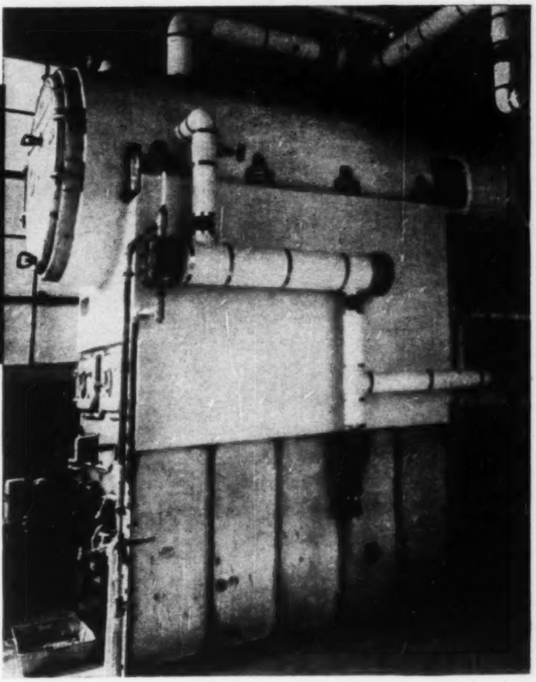
Canadian Representatives: RAILWAY & ENGINEERING SPECIALTIES, LTD.—Montreal, Toronto, Winnipeg

DETROIT

DETROIT HEATING AND REFRIGERATION CONTROLS • ENGINE SAFETY CONTROLS • FLOAT VALVES AND OIL BURNER EQUIPMENT • DETROIT EXPANSION VALVES AND REFRIGERATION ACCESSORIES • STATIONARY AND LOCOMOTIVE LUBRICATORS

Serving home and industry AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILER • ROSS HEATER • TONAWANDA IRON

How would you insulate this boiler?



The steel shell of this oil-fired hot water boiler is heated to 250° F. Which of these insulating materials listed below is most practical?

1. 85% Magnesia block
2. Air cell block
3. Mineral wool blanket

HERE'S WHAT THE ARMSTRONG ENGINEER RECOMMENDED: All too often, small boilers waste a needless amount of fuel. In most cases the blame rests squarely upon the insulation job. Because equipment of this type operates at low pressures and temperatures, many owners seem to be satisfied that their boilers are "insulated" if they have a coat of something white over the surface.

These inadequate insulation jobs are done to cut initial costs. But the savings are always small when compared to the year-after-year extravagance of excessive heat losses.

All three of the insulations listed above will do an adequate insulating job if they're applied in the proper thicknesses, firmly wired in place, and finished with asbestos cement.

From a practical point of view, 85% Magnesia block offers the best solution. Blocks can be quickly wired on and they provide an even surface for the finish. Air cell, while adequate insulation for the low temperatures involved, is more fragile than 85% Magnesia and will not hold up so well in long service. Mineral wool blankets are large and unweildy on an installation as small as this, running up labor costs.

In the heat insulation field, the low initial cost job may be the most expensive in the long run. No matter how large or small a job may be, there's one way of doing it that will bring you the greatest return for your investment. Armstrong engineers can recommend that way to you. The complete contracting service they represent also offers you quality insulating materials and expert workmen to apply them.

FREE BOOKLET

Send today for the new booklet, "Armstrong's Industrial Insulations." It describes completely the materials and services offered to users of insulations for all temperatures. Write today to Armstrong Cork Company, 4401 Maple Avenue, Lancaster, Pennsylvania.

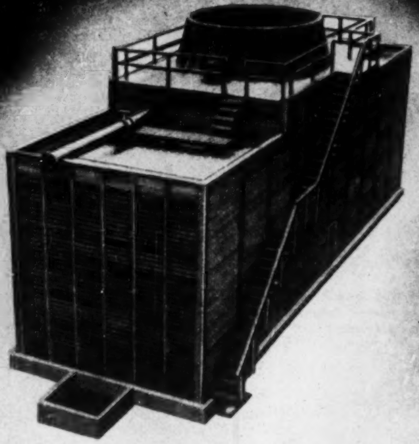
ARMSTRONG'S
INDUSTRIAL
INSULATIONS

ARMSTRONG'S INDUSTRIAL INSULATIONS

MATERIALS Ⓐ INSTALLATION

FOR ALL TEMPERATURES FROM 300° F. BELOW ZERO TO 2800° F.

Specify MARLEY *Double-Flow*



FOR SAFE OPERATION AND MAINTENANCE

STAIRWAY . . . DOUBLE-FLOW towers are equipped with a stairway built at the enclosed endwall of the tower. This eliminates fog envelopment and ice formation on stairways or ladders built over louvered sections. Operators do not have to climb high, dangerous ladders.

HANDRAILS . . . stairway and wide, level fan deck are guarded with high handrails. At no time is the operator at the mercy of high, gusty winds or in danger of inadvertently falling off the tower.

OUTSIDE WALKWAY . . . a short stairway leads to a walkway over each distribution basin. Water level may easily be adjusted or the basin cleaned. Complete flexibility of operation or maintenance is a result without the usual risks and dangers involved.

INSIDE WALKWAYS . . . through the interior of the tower, walkways enable the operator to observe water breakup, condition of structure, and operating conditions of the tower. This can all be checked while the tower is in operation without danger to the operator.

WALLED FAN CYLINDERS . . . each fan is enclosed with a fan cylinder . . . high enough for safety, low enough for easy inspection. And, there is plenty of room between the cylinder and fan deck railing for free movement without risk.

Tower owners and operators know that MARLEY DOUBLE-FLOW towers are SAFE TOWERS . . . safe in any stage of operation or maintenance . . . safe in any weather.

That's why more and more Safety Engineers of America's great industries are recommending MARLEY DOUBLE-FLOW COOLING TOWERS.

Ask for a MARLEY Factory-Trained APPLICATION ENGINEER to tell you more about the MARLEY DOUBLE FLOW Cooling Tower and its numerous SAFETY FEATURES. He'll be glad to help you solve YOUR [illegible] cooling problems. No cost or obligation.

MARLEY COOLING TOWERS

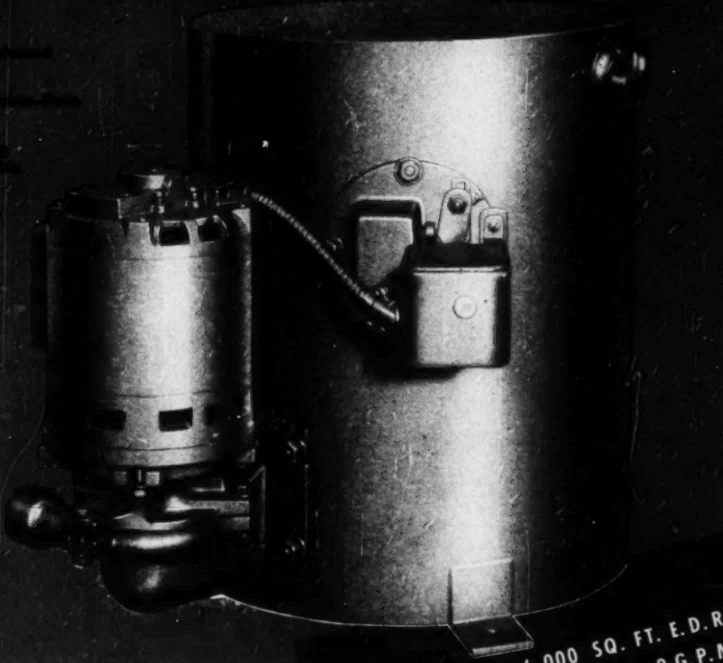
THE MARLEY COMPANY, INC. • KANSAS CITY 15, KANSAS

NEW! LOW PRICE M·R PUMP

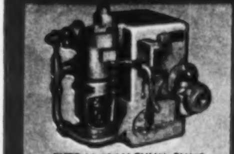
. . . for Low Pressure Steam Heating Systems

- ✓ ½ H.P. Westinghouse Motor
- ✓ Heavy-Duty Double-Pole Float Switch
- ✓ Bronze Wearing Ring For Long Life
- ✓ One-Piece Bronze Impeller
- ✓ Round, Vertical 15 Gallon Steel Receiver

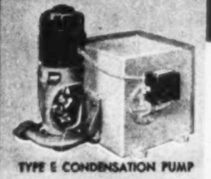
NOW! THE MOST COMPLETE LINE OF HEATING SYSTEM PUMPS IN THE INDUSTRY



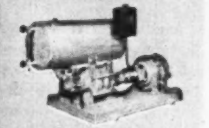
CAPACITY UP TO 6,000 SQ. FT. E.D.R.
20 LBS. DISCHARGE PRESSURE • 9 G.P.M.
SINGLE AND DUPLEX UNITS



TYPE V-V VACUUM PUMP



TYPE E CONDENSATION PUMP



TYPES B AND C

TYPE S

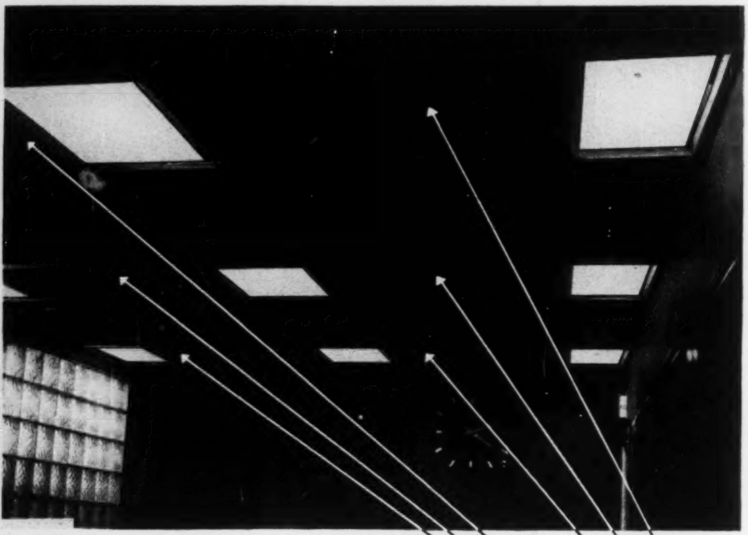
Here's the foremost Pump value, *in high quality features at a low price.* This MR Pump has hand-finished water passages, to minimize friction; impeller is rigidly and concentrically fixed on stainless steel shaft for perfect balance and vibrationless performance; pump casing equipped with bronze wearing ring *—a long-life feature seldom found in low-priced pumps;* pre-lubricated bearings; spring loaded bronze seal; motor and impeller assembly can be lifted by removing three bolts*—and without disconnecting any piping.* These are typical Hoffman quality features, that prove their worth in service. Write now for Bulletin CP-949, and specify a Hoffman MR Pump on that next low pressure steam heating job.

HOFFMAN
• ECONOMY
TYPE M·R
CONDENSATION
PUMP

HOFFMAN SPECIALTY COMPANY

Main Office and Factory: Dept. FG-1, 1001 York St., INDIANAPOLIS 7, INDIANA • *Sales Representatives in Principal Cities*

For *complaint-free* low velocity air distribution

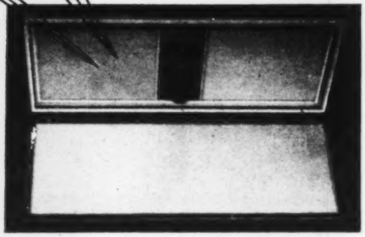


THE CARRIER CORPORATION OFFICES, New York City. Multi-Vent panels, barely discernible in beautiful, plaque-type coffered ceiling. Remarkably fine temperature regulation achieved by varying air volume in each zone with thermostat controlled modulating dampers.

Use the Best...

Use MULTI-VENT *Ceiling Panels*

T. M. Reg. U. S. Pat. Off.



Though the cost of supply and return air outlets is a very small percentage of the overall cost of a good air conditioning system, economizing in the selection of air distribution media is often the cause of complaints from clients on drafts, uneven temperatures, insufficient air, noise and dirty ceilings.

Multi-Vent is better able than any other diffuser to provide widespread uniform air distribution, without these common objectionable conditions because the basic draft, noise and dirt hazards, inherent in all other diffusers, are non-existent in the unique Multi-Vent principle of *distributing air entirely by displacement rather than by high velocity injection.*

In distribution by displacement there are *no* strong air streams to aim and *no* change in air flow pattern when air supply is varied. Regardless of room size, ceiling heights and relative positions of partitions, beams, etc., *all problems of outlet location and air direction adjustments for throw and drop to avoid drafts are eliminated.*

Multi-Vent, moreover, can handle greater amounts of air in proportion to room size than any other diffuser and still maintain a rate of air motion low enough to meet not only the most exacting comfort zone requirements but also to solve the high load and high ventilating problems in critical laboratory and industrial processing areas.

Multi-Vent has many other advantages such as savings in basic heating, cooling and air handling equipment in addition to the important installation, maintenance and decorating economies.

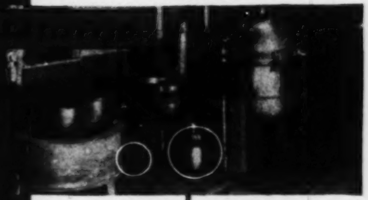
Write for detailed literature and the name of our sales engineer in your vicinity.

MULTI-VENT DIVISION • **THE PYLE-NATIONAL COMPANY** 1373 N. KOSTNER AVE., CHICAGO 51, ILL.

YOUR ENTIRE AIR CONDITIONING SYSTEM WILL BE JUDGED BY THE PERFORMANCE OF THE OUTLETS

"This Steam Trap is unconditionally guaranteed to satisfy you!"

YOU CAN'T LOSE



SAVED 3728 GALLONS OF FUEL OIL in one year after replacing old traps with Armstrongs on kettles, low pressure heating system and cream beaters.—*Mary Lincoln Candies, Buffalo, New York.*

30% LESS MAINTENANCE with Armstrong traps on heating and steam distribution system.—*John Deere Harvester Works, East Moline, Ill.*

COOKING KETTLE OUTPUT SPEEDED UP 30% by Armstrong trapping on each steam jacketed kettle.—*Bulman's Ltd., Vernon, B. C.*

EVERY Armstrong steam trap is guaranteed to be free from defective workmanship or material, to function perfectly, to fulfill all claims in every respect and to give complete satisfaction.

ONLY A GOOD STEAM TRAP COULD *POSSIBLY* BE PACKED BY SUCH A GUARANTEE! To save fuel, to reduce maintenance, to get more work out of existing equipment, to get complete steam trap satisfaction, ask your nearby Armstrong representative to discuss with you the traps you need now.

ARMSTRONG MACHINE WORKS
874 Maple St., Three Rivers, Mich.

SEND FOR YOUR COPY OF THE 36-PAGE ARMSTRONG STEAM TRAP BOOK explaining the design and workmanship that make the Armstrong guarantee possible. Complete data on the selection and installation of traps for all classes of equipment. Free on request.

The ARMSTRONG BOOK

ARMSTRONG STEAM TRAPS

WHY fireye

There's only one reason for putting a Flame Failure Safeguard on an oil or gas burner . . . to prevent an explosion . . . to safeguard your entire plant, equipment, and personnel.

Fireye insures complete flame failure protection because it is photoelectric . . . it sees the flame . . . and if the flame fails, Fireye acts with the speed of light to cut off the fuel *before* dangerous gases accumulate in the combustion chamber.

Controls which do not react instantaneously can not provide full protection . . . for it is the few seconds of delay between flame failure and fuel shutoff which charge the combustion chamber with potential destruction.

Fireye is the outstanding combustion safeguard which meets the exacting requirements of insurance laboratories for the protection of ALL classifications of oil and gas burner installations.

FACTORY MUTUAL
FM
APPROVED

UL

Write for bulletin 604-B

fireye

COMBUSTION CONTROL CORP.

77 BROADWAY, CAMBRIDGE 42, MASS.

T F
6" STD TF TAYLOR FORGE WELDELL

...easier and better the WeldELL way

For the *practical* facts about pipe welding fittings go to the *practical* men...the welding foreman; the pipe fitter foreman; the construction superintendent... who have used all kinds and know the field.

They will tell you that the job moves faster and costs stay down when WeldELLS and other Taylor Forge fittings are used

> ...because of the precision quarter markings, the sized end tangents, the accurate machine tool bevels and lands.

They will tell you that the job maintains momentum easier, smoother

> ...because of the completeness of the line and better identification markings.

They can tell you...at least, design men will...that the *finished* job is better

> ...because it is done with fittings that are engineered down to the last detail to meet all requirements of *every job*.

Yes, "WeldELLS have everything"...to make it *easier* ...*better*. Coupon brings lots of facts.

TAYLOR FORGE

TAYLOR FORGE & PIPE WORKS • *General Offices & Works:* Chicago 90, Ill. (P.O. Box 485). *Eastern Plant:* Carnegie, Pa. *Western Plant:* Fontana, Calif. *District Offices:* New York: 50 Church Street. Philadelphia: Broad Street Station Bldg. Pittsburgh: First National Bank Bldg. Chicago District Sales: 208 S. LaSalle Street. Houston: City National Bank Bldg. Los Angeles: Subway Terminal Bldg.

Please send a copy of your new welding fittings and forged steel flange catalog 484

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Position____________________

Company ____________________

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Mail to Taylor Forge & Pipe Works
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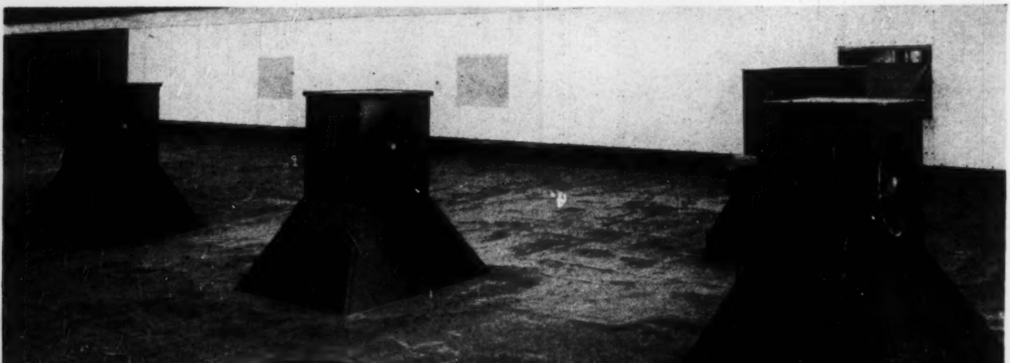
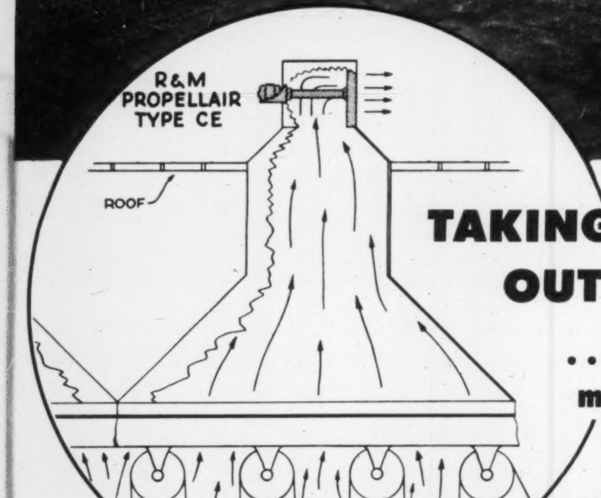




TAKING THE STEAM OUT OF THE ROLLER

. . . PROPELLAIR helps make "paper profits" real

It was a familiar problem to Propellair engineers—moisture removal. A large Eastern paper manufacturer was troubled by steam forming over drying rolls. Sixteen R & M extension shaft fans came to the rescue. These fans are mounted in vertical stacks rising out of the hoods surrounding the paper-drying machines. Motors are mounted outside the stacks away from dampness. Many tons of moisture are removed daily by this set-up.

PROPELLAIR FEATURES

Blades are actual airfoils, give greater efficiency. Perfection of entrance housing lowers entrance losses. All motors carefully constructed for fan duty applications. Special moisture-proof, explosion-proof and glass-insulated motors on request.

VARIETY AVAILABLE

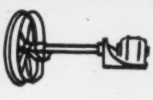
Propellair comes in many sizes and designs to give top performance for any application. Our engineers will advise you on installation of extended shaft, direct-connected, belt-drive, cradle-mount, pedestal-mount. Propellair provides the economical, efficient solution to all ventilating problems.

PROPELLAIR
DIVISION OF ROBBINS & MYERS • INC.
SPRINGFIELD 99 OHIO

WRITE, WIRE OR PHONE FOR DETAILS

DIRECT-CONNECTED, MANY USES

EXTENDED-SHAFT PROTECTS MOTOR



STAND-MOUNTED

DRUM-TYPE FOR DUCTS & STACKS

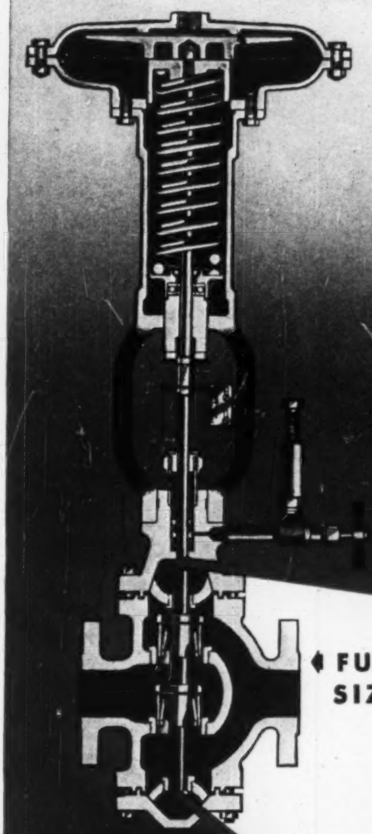
RESTRICTED INNER VALVE PROCEDURE FOR

FISHER

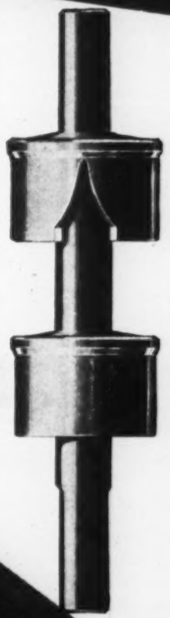
DIAPHRAGM CONTROL VALVES . . . .

The introduction of Fisher's new restricted inner valves offers a quick, economical and completely satisfactory way to reduce the effective capacity of a larger nominal valve size.

INTERCHANGEABLE



◀ 1 SIZE
SMALLER

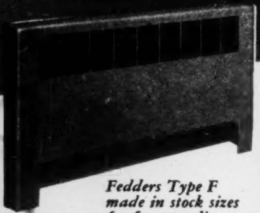


PRACTICAL

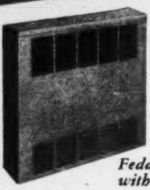
For example, a 4" valve can quickly be converted to flow capacity of a 3" 2½", or 2" size. This is accomplished by the restricted V-Port Inner Valve alone—without changing seat rings. Inner valves with equivalent smaller size valve area or capacity are fully interchangeable with standard full size inner valves. Inner valve skirts are cast stainless steel with wide range percentage characteristics port areas. Cast skirts are welded on to stainless steel bar stock center post guide. Further details and application data gladly furnished on request.

FISHER GOVERNOR COMPANY MARSHALLTOWN, IOWA

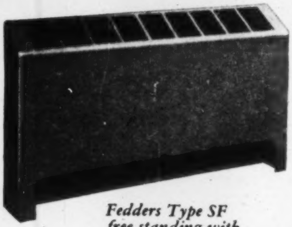
fedders A Great Name Since 1896 OFFERS AMERICA'S



Fedders Type F made in stock sizes for free standing and semi-recessed installations.

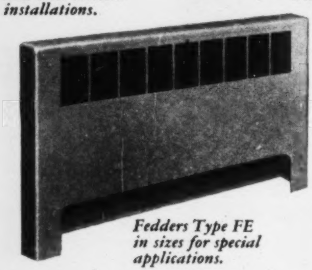


Fedders Type FB with base grille.

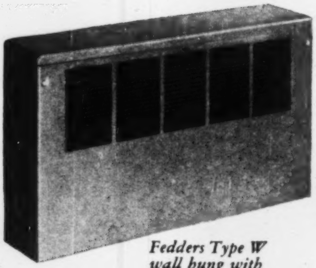


Fedders Type SF free standing with sloping top.

Fedders Type SFB free standing with sloping top and base grille.

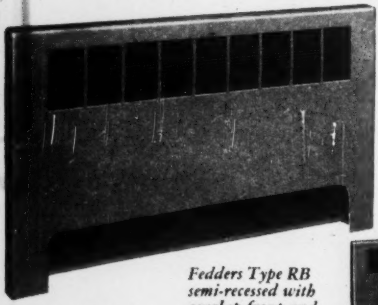


Fedders Type FE in sizes for special applications.

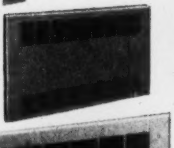


Fedders Type W wall hung with flat top.

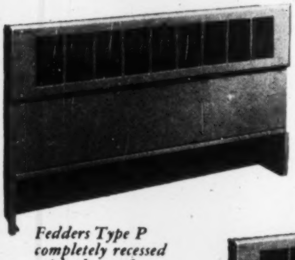
Fedders Type S wall hung with sloping top.



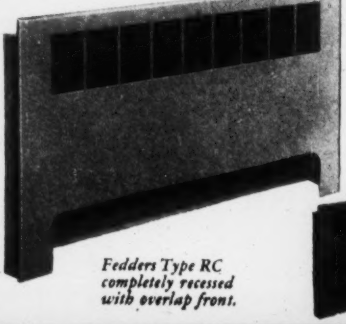
Fedders Type R semi-recessed with overlap front.



Fedders Type RB semi-recessed with overlap front and base grille.

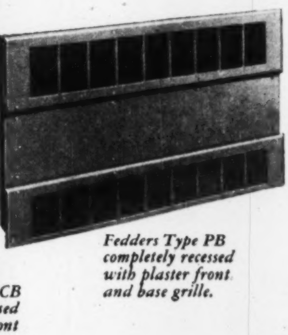


Fedders Type P completely recessed with plaster front.



Fedders Type RC completely recessed with overlap front.

Fedders Type RCB completely recessed with overlap front and base grille.



Fedders Type PB completely recessed with plaster front and base grille.

MOST COMPLETE LINE OF

CONVECTOR RADIATORS

● Fedders Convector-Radiators are made in sizes and types to fit every heating requirement.

They are made in standard Type F free-standing and semi-recessed models available from stock and also a wide range of models for special applications.

Men who design, sell and install heating equipment can take advantage of Fedders wide range of models including flat and sloping top, wall hung and free-standing models with and without base grilles. Other models include steel and completely encased Convector-Radiators with overlapping and plaster fronts to conform to any decorative scheme.

Fedders heating elements also available for use with individually designed concealed systems. Heating elements provide quick response to manual and thermostatic control. Write for data sheets. Consult yellow section of phone book for your local Fedders representative.

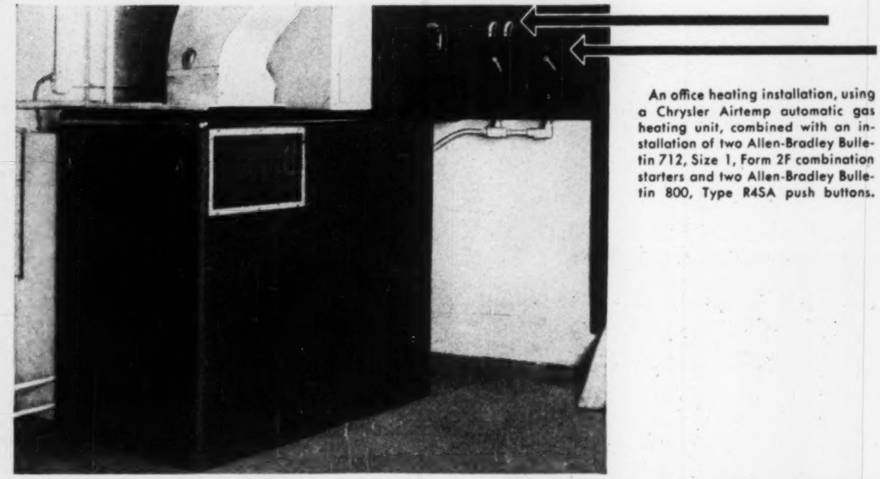
Also manufacturers of Fedders Unit Heaters, Wall Radiation, Unit Coolers, Air Cooled Refrigeration Condensers, Room Air Conditioners, Automotive Radiators and Car Heater Cores.

Photo shows attractive space saving design of Fedders Type F Convector-Radiator installed in modern living room.

Fedders

A Great Name Since 1896

FEDDERS-QUIGAN CORPORATION • BUFFALO 7, N. Y.

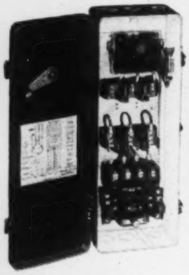


An office heating installation, using a Chrysler Airtemp automatic gas heating unit, combined with an installation of two Allen-Bradley Bulletin 712, Size 1, Form 2F combination starters and two Allen-Bradley Bulletin 800, Type R4SA push buttons.

Airtemp AIR-CONDITIONERS

equipped with

A-B Quality Trouble Free Motor Controls



Bulletin 712, Size 1, Form 2F, fused disconnect switch combination starter in a NEMA Type 1 general purpose enclosure. Note the generous wiring room and many knockouts.

WHY ARE ALLEN-BRADLEY STARTERS SO POPULAR for air-conditioning service? . . . Because they are trouble free. Only one moving part. No pivots, pins, or bearings to corrode or stick . . . no jumpers to break. You install them . . . and forget them!

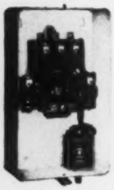
NO CONTACT MAINTENANCE. Allen-Bradley patented silver alloy contacts never need cleaning, filing, or dressing.

DEPENDABLE OVERLOAD RELAYS. Allen-Bradley thermal relays are accurate and dependable even after long service.

The A-B trademark stands for millions of trouble free operations.
Allen-Bradley Co., 1335 S. First St., Milwaukee 4, Wisconsin.

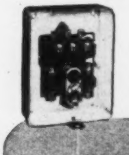
ALLEN-BRADLEY AIR-CONDITIONING AND REFRIGERATION CONTROLS

PRESSURE AND TEMPERATURE CONTROLS

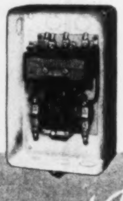


High-pressure cutout and motor starter in same enclosure. Temperature controls can be mounted with motor starter in same way.

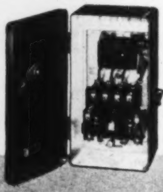
MANUAL STARTER



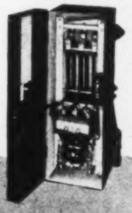
AUTOMATIC STARTER



COMBINATION STARTER



HEAVY COMPRESSION STARTER



ALLEN-BRADLEY

SOLENOID MOTOR CONTROL

QUALITY

To keep maintenance [illegible] *TIGHT SPOT!*

ADSCO *Corruflex*
PACKLESS EXPANSION JOINTS

The maintenance of expansion joints in difficult-to-service or remote locations is costly in both man-hours and shutdown losses. ADSCO *Corruflex* Packless Expansion Joints *eliminate* those costs by eliminating the causes. They never require packing or maintenance of any kind.

Corruflex Joints are on the job all the time . . . absorbing pipeline expansion and contraction resulting from temperature changes . . . protecting lines and equipment from undue strain.

And ADSCO *Corruflex* Joints are easy to install. Their compactness—with a maximum outside diameter scarcely larger than that of an ordinary flange—makes them ideal for use in trenches, tunnels or other cramped quarters where maintenance costs may be unusually high.

Like other ADSCO products, *Corruflex* Joints are built to the highest standards. They are available in sizes from 3″ to 24″, single or double units, single or multiple corrugations, with or without self-equalizing rings, and with flanged or welding ends. They are supplied in copper, stainless steel or other alloys and with internal sleeves if required.

Corruflex Joints have traverses ranging from fractions of an inch to 15″ and operate under pressures from vacuum to 300 psi and temperatures from sub-zero to 1600 F.

For dimensions and further information, consult your ADSCO representative or send us your requirements for our recommendation. For descriptive literature, write for Folder No. H-149.

ADSCO offers the most complete line of expansion joints available from any manufacturer. For an impartial installation recommendation, consult the company that makes all types.

EXPANSION JOINTS — HEAT EXCHANGERS
STEAM TRAPS — STRAINERS — METERS
CASING — ANCHORS — GUIDES

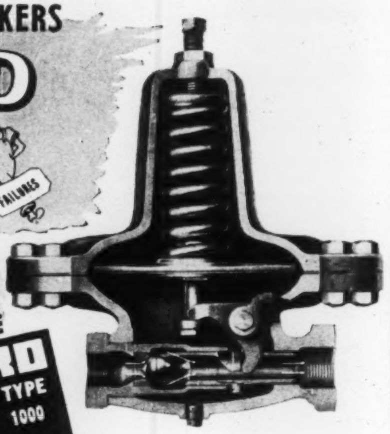
Leaders
Since
1877

AMERICAN DISTRICT STEAM CO.
NORTH TONAWANDA, N. Y.

THESE TROUBLEMAKERS OUSTED

MAINTENANCE
POOR REGULATION
REPLACEMENTS
SPOILAGE
STOPPAGES
FAILURES

FROM PLANTS EQUIPPED WITH THE CASH STANDARD *Streamlined* PRESSURE REDUCING VALVE TYPE 1000



. . . USER STATEMENTS THAT FOLLOW . . . TELL WHY

A MANUFACTURER OF RUBBER PRODUCTS SAYS–

"It is very easy for us to check every one of the 10 points because of the fact that the CASH STANDARD Type '1000' Streamliner which we purchased from your company replaced an old style hand operated valve which took constant manual attention to guarantee accurate pressure results. We do not hesitate for a minute to compliment you on manufacturing an excellent product and, as our needs increase, so will our use of CASH STANDARD Streamlined Valves."

ANOTHER MANUFACTURER IN CHECKING OUR 10 POINTS SAYS —

"The CASH STANDARD Valve is one of the finest pieces of equipment in use in our new plant. CASH STANDARD valves are not new to us; for over 38 years they have played a leading part in our production."

A MANUFACTURER OF MACHINES CHECKS ALL OF THE 10 POINTS AND SAYS—

"We use these '1000' valves in the smaller sizes on compressed air lines. They are indeed a pleasant surprise and I check fully with your 10 points. I have no intention of switching to another design."

WE CHECK WITH EVERY ONE OF THE 10 POINTS WRITES A MANUFACTURER FROM ONTARIO

"We do not have many of these valves at present but our maintenance department has asked that they be used wherever possible in replacements. It is claimed that they are not only very simple in their construction, but that they take up so little room. After reading your list of questions it was suggested that we check every one of them."

✓ **1. Maximum capacity when needed most.**
✓ **2. Accurate pressure control under toughest working conditions.**
✓ **3. Trouble-free service.**
✓ **4. Smooth operation.**
✓ **5. Tight closure.**
✓ **6. Speedier production results.**
✓ **7. Elimination of failures.**
✓ **8. Cost-saving operation.**
✓ **9. No spoilage.**
✓ **10. Practically zero in maintenance.**

Send **FOR BULLETIN 962**

CASH STANDARD
CONTROLS... VALVES

A. W. CASH COMPANY
DECATUR, ILLINOIS

•

BULLETINS AVAILABLE ON OTHER CASH STANDARD VALVES

Send for them

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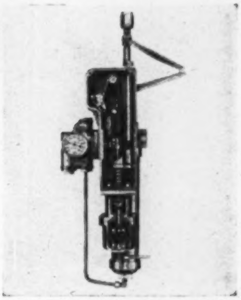
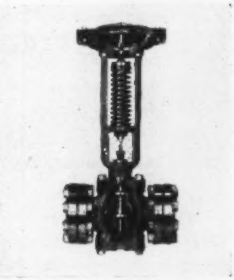
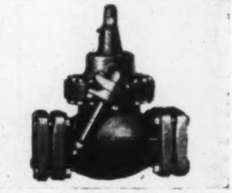


Bulletin 963 features the CASH STANDARD Type 100 Series of Super-Sensitive Controllers — various types for automatically operating valves, dampers, rheostats, stokers, pulverizers, fans, and other apparatus. 16 pages filled with descriptions and applications.



Bulletin 968 features the CASH STANDARD Type 34 Pressure Reducing Valve — direct operated — direct acting for handling steam, hot water, cold water, air, oil, brine—and most liquids and gases except some injurious chemicals. Illustrates and describes the different styles available and tells about their applications. Three pages of capacity charts.



Bulletin 956 features the CASH STANDARD Type 4030 Back Pressure Valve — designed to automatically maintain a constant pressure in the evaporator corresponding to a constant temperature desired. Shows an Ammonia and Freon Gas Capacity Chart based on ABSOLUTE pressures.

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● Radiant heating is another application where Spang CW Pipe is an excellent material. It has helped provide shirtsleeve comfort at zero in thousands of similar, closed, hot water heating systems.

What's more, Spang CW has other advantages that make it fit radiant heating systems like a hand in a glove. You'll find that no fussy care is necessary to make strong, leak-proof, welded joints. It is also a good material to cut, thread or bend. And Spang CW Pipe has the same co-efficient of expansion and contraction as concrete and plaster.

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Paying 30%
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Now to save the
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Glasfloss
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AIR FILTERS

Why pay for frames and throw them away! Glasfloss refill type filter pads are furnished in lightweight reuseable frames. When the pad has accepted its full load of dust—throw it away—insert a Glasfloss refill pad and save the 30% that represents the cost of the frame!

This is a startlingly new idea you can't afford to miss. Glasfloss refill type filter pads cost less than cleaning old pads for re-use. Glasfloss fibres are so soft and fine that they are safe and comfortable to handle.

Soft as a cobweb—Glasfloss fibres form a pad that stops and holds more dust, a fact proved in service under standard industry conditions. For full details write Dept. **FA.**

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THE EDITOR'S PAGES

This month: Two editorial features appear in this issue of HPAC. One of them is the annual Directory Section of heating, piping, and air conditioning equipment for industrial, commercial, institutional, and public buildings—which has been thoroughly revised and brought up-to-date. We know you'll want to preserve it for ready reference during 1950. . . . The other special feature is the Show Section, which "previews" the Southwest Air Conditioning Exposition in Dallas January 23-27, and which contains complete information on the 56th annual meeting of the American Society of Heating and Ventilating Engineers, to be held in the same city that same week. . . . As is usual each January, these features are in addition to our regular monthly editorial content, including the ASHVE's Journal Section. . . . Our regular articles include discussions of developments in heating, piping, and air conditioning over the past 50 years (more or less); we hope you'll consider them timely as we enter the 1950's. . . . Because one of them is by Samuel R. Lewis, we're omitting this month the regular "Sam Lewis' Page," which has been published in each issue for some time and which will be resumed in February. . . . If you want a copy of the index to HPAC's 1949 issues, send a card or note to the Editor, Heating, Piping & Air Conditioning, 6 N. Michigan Ave., Chicago 2. It's being compiled, and a copy will be mailed (without charge) to each subscriber requesting it as soon as it's ready. . . . Our Equipment Developments columns (of ever-increasing interest) will cover the new and improved products displayed at the Dallas exposition. The first page of this department includes a request coupon each month for your convenience in asking for further information about new equipment and copies of recent trade literature.

CONSTRUCTION VOLUME RECORD SET

A new high dollar volume of construction was attained in 1949 in the area east of the Rocky Mountains, according to Thomas S. Holden, president of F. W. Dodge Corp. Statistical tabulations of building and engineering project contracts awarded in the 37 states in the first 11 months of the year show a greater dollar volume than that reported for the entire year 1948, when a new alltime high mark was set, Mr. Holden disclosed.

The cumulative volume of investment commitments for the year through November was $9,430,220,000, against $9,429,618,000 reported for the 12 months of '48. Compared with the first 11 months of 1948, contract valuations were up 8 percent.

"The building uptrend which began in August continued to gain an accelerated momentum, with the November '49 contract volume showing a sharp 57 percent gain over November '48," Mr. Holden said. "Particularly significant, I believe, is the fact that the 56 percent gain in private contracts almost paralleled the 59 percent increase in public account work in November '49 compared with November of 1948. Private work in November totaled $642,078,000 against a public account volume of $315,683,000."

The overall residential total for 1949, including hotels, dormitories, two family houses, and other kinds of shelter, was $3,820,335,000 or 14 percent more than in the first 11 months of 1948.

Public residential building took on increasing importance in 1949, with an 11 month volume of $326,826,000 or 120 percent more than in the same period of 1948. Private residential work in the 11 months totaled $3,493,509,000 to show an increase of 9 percent.

While most major classifications of nonresidential building showed gains over 1948, a sharp 37 percent decline in industrial building, and moderate decreases in commercial, social and recreational building, brought about an overall deficit of 2 percent.

Biggest gains in the nonresidential group were shown for public buildings, up 50 percent; hospital and institutional building, up 35 percent; educational and science building, up 15 percent; and religious building, up 10 percent.

IF YOU'RE GOING TO DALLAS . . . .

If you plan to be in Dallas this month for the Southwest Air Conditioning Exposition and the annual meeting of the American Society of Heating and Ventilating Engineers, here's a tip that will save you time, trouble and fallen arches.

Study in advance the Show Section in this month's issue. It gives complete information on both the meeting program and the exposition exhibits. By checking over in advance the equipment and products to be displayed at the exposition, you'll be sure not to miss what you want to see when you get there, and it will help you to save time and energy.

It's a good idea to take your copy of Heating, Piping & Air Conditioning along to Dallas so you'll have it on hand for reference during the busy week there.

And if you don't plan to attend the exposition, this month's Show Section will of course help keep you posted on equipment developments and new products.

TO EXPLAIN CLIMATE'S EFFECT ON HOUSING

The dominant part which weather and climate play in the design and construction of housing will feature the programs of the 30 chapters of the Producers' Council during 1950, according to Charles M. Mortensen, executive secretary.

"One program available to the chapters and its guests from other industry branches will consist of a panel presentation in which manufacturers of glass, insulation and temperature controls will discuss the basic principles involved in indoor climate control," Mr. Mortensen said.

"A second program, sponsored by a national magazine in the housing field, will present the results of original research in climatology and explain its significance."

THE EDITOR'S PAGES

STEEL BOILER SALES EXCEED ESTIMATES

SALES OF STEEL boilers during 1949 have exceeded the estimates made earlier in the year, it was reported by R. A. Locke, president of the Steel Boiler Institute, at a meeting at White Sulphur Springs, W. Va. With respect to sales in 1950, Mr. Locke said it appears that they will be only 7 percent less than 1949.

While shipments of steel boilers for the first quarter of 1949 were 22 percent under shipments during the corresponding period of 1948, shipments for each period since May 1949 have exceeded shipments for the same period in 1948, Mr. Locke reported. At the end of the third quarter of 1949, the shipments of low pressure heating boilers were only 3½ percent less than those of the first three quarters of 1948.

Mr. Locke reported that the extension of gas lines throughout the country is resulting in an increase for gas fired boilers for both residential and commercial use and it is expected that this increase in demand will continue to grow.

IBR ANNOUNCES NEW PROGRAM

A NEW promotional program for 1950 to bring the latest developments in hot water and steam heating to the attention of architects and professional builders was approved at the annual meeting of the Institute of Boiler and Radiator Manufacturers. The activity will include a series of meetings with professional builders and architects throughout the country. The meetings will be sponsored by IBR while participants will include representatives of IBR members in the various cities.

A record attendance of members, associate members and international members marked the meeting. W. C. Murray, president of the Utica Radiator Corp., was re-elected chairman of the institute, and S. K. Smith, president of the H. B. Smith Co., was re-elected vice chairman. R. E. Ferry is general manager and treasurer.

A sharp upturn in the sales of cast iron boilers, radiators, baseboards and convectors was reported at the meeting. Manufacturers expressed their confidence in a continued high level of boiler and radiator sales throughout 1950. Some indicated that the current high level of construction pointed to a larger volume of sales in 1950 than in 1949.

A movement to test and rate baseboards was started at the meeting. It was reported that there are now 27 manufacturers of various types of baseboards.

NEARLY 10,000 AT ALL-INDUSTRY SHOW

THE SIXTH All-Industry Refrigeration and Air Conditioning Exposition, held recently at Atlantic City, was pronounced "the most successful in the history of the Refrigeration Equipment Manufacturers Association" by its president, K. B. Thorndike, vice president of the Detroit Lubricator Co.

In commenting upon the show, Mr. Thorndike called attention to the fact that the number of exhibitors had risen from 174 at Cleveland in January 1948 to 212 at Atlantic City, and stated that more new products and new designs were on display at this show than at any one. Attendance topped that of the last exposition, nearly reaching the 10,000 mark.

Mr. Thorndike has announced that the next All-Industry Refrigeration and Air Conditioning Exposition will be held at Navy Pier, Chicago, November 1951.

AS OTHERS SEE US

CALLING ON THE British building industry to capture the spirit of the American competitive system and individual initiative, the 17 man British building team, which recently completed a six week study of construction methods in the United States, declared in a joint statement that American building craftsmen are 50 percent more productive than British construction workmen.

The efficiency of American craftsmen was largely attributed to design, managerial direction, preconstruction planning, organization of the work at the job site, mechanization, adequate supply of materials, and "in the outlook of each individual member of the building team."

The report pointed out that an analysis of a large number of American building contracts indicated that overall building costs in the United States are approximately 55 to 80 percent higher than in Great Britain. But it emphasized that the most important factor was the high wage scale, which is four times greater than prevailing wages in Britain. High wage rates are overcome, the report said, by efficiency of contractors in organizing and planning the work, adequate supply of materials and the consequent higher productivity of the craftsmen.

SEES HIGH LIVING STANDARD

A "FABULOUSLY high standard of living" can be produced in the United States in the next 50 years if the interests of all the major groups in our economy are kept in balance, Secretary of Commerce Charles Sawyer said last month.

In an address in New York on "a new liberalism for the next half century," the Secretary told members of the Public Relations Society of America that the basic idea of the new liberalism as opposed to the older liberalism of the 19th century was "the idea of balance, the idea that there is a middle ground which is best for all in the long run."

Secretary Sawyer said we have not yet reached the time when the various groups in our economy forget their special interests and talk out their differences in a spirit of "sweet reasonableness." However, he said, we have made progress.

Fight Infantile Paralysis

JOIN THE MARCH OF DIMES

THE NATIONAL FOUNDATION FOR INFANTILE PARALYSIS

INFRA RETARDIVE
is the economical insulation

For less than 6¢ sq. ft., material and labor included, install
ALUMINUM RETARDIVE *in* WALLS *and* CRAWL SPACES

Just Look at These
THERMAL FACTORS

****Ceiling, Summer; Crawl Spaces, Winter***

***DOWN HEAT C .097 = 3⅖" Dry Rockwool**
WALL HEAT C .148 = 2⅕" Dry Rockwool
UP HEAT C .185 = 1⅘" Dry Rockwool

Vapor Permeability is ZERO

Retardive throws back 97% of the RADIATED HEAT which strikes it; completely blocks CONVECTION. Absolutely impervious to water vapor and other gases, including hot and cold air. A FIRE STOP, because it is heavy metal and nothing else, and is practically NON-EMISSIVE (will therefore bar secondary ignition of objects on the side away from a fire.)

BEHIND RADIATORS

There is substantial heat loss from walls behind radiators, especially if recessed. Heat by Conduction, Convection, and especially Radiation, hits the wall, flows through it, and is dissipated outside. Retardive, installed with proper air space behind a radiator, reflects back INTO THE ROOM a large amount of the otherwise wasted heat.

IN WARM CLIMATES

In warm climates and tropic regions, Retardive is the economical insulation for attics and walls. Mold, vermin and termite proof, it also bars water vapor, moisture and heat.

UNDER FLOORS AND IN CRAWL SPACES

Retardive prevents heat loss through floors and crawl spaces and creates foot comfort. Otherwise, invisible heat rays, which have no temperature, following nature's law that warm flows to cold in Radiation, will flow from warm ceilings and walls to cold floors and be dissipated to the earth below.

EXTRA TOUGH

Retardive, .002" thick, has a bursting strength of 52 lbs. per sq. in. (Mullen test), compared with a bursting strength of 3 lbs. for ordinary foil. It can be used in spaces as shallow as ½", and is made for 8", 16", and 24" centers. Compactly packaged in 375 ft. lengths.

USE COUPON FOR YOUR FREE COPY of National Bureau of Standards tests with aluminum insulation in CRAWL SPACES, for heat and vapor flow and condensation, reported by Technical Division of National Housing Agency in Technical Bulletin No. 38.

Infra Insulation Inc., 10 Murray St., New York 7, N. Y.
Please send "N.H.A., Nat. Bur. Standards, Technical Bulletin No. 38." **AC**
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Steam-Distributing Tubes

**MADE BY JOHN J. NESBITT, INC.
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Sold by Leading Manufacturers of Fan System Apparatus**

When your system results are predicated on uniform discharge temperature from the heat transfer surface, you must KNOW that the surface you specify will DELIVER . . . So you must look beneath the surface for the best assurance there is that even small amounts of steam under modulated control will be distributed UNIFORMLY over the entire coil. You find it in the steam-distributing tubes of Nesbitt Series D Heating Surface . . . orificed tubes within the condensing tubes . . . an original Nesbitt application that has been tested and proved in thousands of installations. Would you like Publication 247?

"OPEN FOR DISCUSSION"

DO YOU HAVE something to say about any of the articles published this month? An additional comment, or perhaps a question on some point? Or do you want to express your views on some other matter of interest to heating, piping, and air conditioning engineers or contractors? We follow here the custom at engineering society meetings of allowing a period for discussion following presentation of a paper. You are invited to contribute your comments. Address the Editor, Heating, Piping & Air Conditioning, 6 N. Michigan Ave., Chicago 2.

RADIANT HEATING'S EFFECT ON PLASTER

IN THE COMMENTS on the effect of heat on plaster, by George M. Fraser, published on the "Open for Discussion" pages in the December HPAC, and referring to radiant heating installations, the following statement occurs: "The maximum water temperature of 125 F generally can be expected to give a surface temperature of approximately 115 F on the plaster directly beneath the tubes, which temperature is usually deemed desirable in rooms with ceiling heights from 8 to 11 ft." The water temperature of 125 F will ordinarily give a surface temperature of approximately 115 F in the typical installation detail. The usual ceiling height in residences is seldom over 8 ft. Therefore, the physiological requirements of temperature limitation for ceilings 8 ft and under would be more important in the residential fields than for ceilings 8 to 11 ft. It is my understanding that the temperature for ceilings 8 ft and under should not exceed 100 to 110 F from a comfort standpoint.

In another paragraph, Mr. Fraser states: "However, with over-sanding, the heat transmission of plaster will be reduced and the effect of such practice, which is poor under any circumstance, may result in accelerated plaster failure." This statement is questionable. Over-sanding will result in increasing heat transmission of the plaster. Of itself, I do not believe that the increased heat transmission of the plaster will result in acceleration of plaster failure. However, we do recommend that all plastering be done in accordance with the recommended requirements of the American Standards Association's specifications for gypsum plastering. Adherence to such specifications will preclude over-sanding.

I note that Mr. Fraser uses the term" rock lath," which is a proprietary trade name. The generic term is "gypsum lath."

Mr. Fraser also makes the following statement: "The hairline crack problem is thereby eliminated, but probably higher air temperatures will have to be carried to get heat through the ceiling surface . . ." I do not believe we can justify a categorical statement saying that the hairline crack problem is eliminated because an air flow system is substituted for coils. It might be more proper to say such cracks are "minimized." Also, he makes the statement: "However, as the temperature is uniform, the temperature within the rock lath should not exceed 125 F. This permits a surface temperature on the backing paper of 135 F or higher." I do not believe that the air temperature in the duct space adjacent to the backing paper of the lath should exceed 135 F.

With a temperature of 135 F for the air in contact with the back paper of the lath, the temperature immediately within the lath adjacent to the back paper will be approximately 125 F. This is the maximum temperature we can recommend for this point as far as long time exposure to calcination is concerned. There is this difference in considering the gypsum lath forming the under side of an air duct as opposed to the condition wherein pipes are embedded in the gypsum plaster below the lath. In the former, a deterioration of the plaster core at the interface between it and the paper can result in bond failure and sagging of the plaster and lath. In the latter, the calcination bordering the pipe tends to make an insulative layer around it of minor thickness without contributing very greatly to weakening of the structure unless unduly continued.

In general, I subscribe to the viewpoint that the limit control must not be set above 140 F from a comfort standpoint. If this limit control is at the furnace, the temperature above the panels at some distance from the furnace will probably not exceed 135 F. An air temperature in the duct of 135 F corresponds roughly with a surface temperature of 112 F, which is as high a surface temperature as can be physiologically justified for ceilings about 8 ft in height.

A further precautionary recommendation that Mr. Fraser might have given in his remarks is that in radiant panel heating systems where the pipes are to be embedded in plaster applied to metal lath or gypsum lath, these pipes should be supported by the framing and not by the lath alone.

It is further recommended that the temperature of the gypsum plaster not exceed 90 F or atmospheric temperature, whichever is greater, until the plaster has set and is thoroughly dried. Otherwise, I believe Mr. Fraser has done an excellent job of presenting this subject.—JOHN A. ROBERTSON, assistant research manager, United States Gypsum Co.

TEXTILE A.C. SETS PATTERN FOR INDUSTRY

THE OUTSTANDING development of air conditioning in the textile industry since the end of the last war has established a pattern for industry and will continue to modify air conditioning techniques as further textile advancements are made, P. L. Davidson, consulting engineer, told the American Society of Mechanical Engineers at its 70th annual meeting. Mr. Davidson read a paper prepared in collaboration with an associate, John deB. Shepard.

"It is quite natural that the textile industry should take the lead in air conditioning in the industrial

"OPEN FOR DISCUSSION"

field as from the inception of mass textile production, control of atmospheric conditions as an essential to proper fiber processing has been an industry problem," said Mr. Davidson. "In fact, the phrase 'air conditioning' had its birth in the textile industry where the process of controlling the temperature and humidity of the air within mill interiors was primarily considered as conditioning yarn by means of air. Even prior to the development of factory textile production, when the industry was still operated on a 'cottage' basis, the finest production was obtained in those sections of the world where natural climatological conditions favored the processing of the fibers."

Responsible for changes in air conditioning systems, he said, are the invention of new processing machines like the double deck twister and the design and production of new fibers to meet the varying fashion trends requiring very sudden changing of the arrangement of machine operation. He explained that the substitution of fibers such as nylon for silk, rayon for cotton or spun for filament yarns requires changes in the relative humidity required for the process. This change in styling necessitates changes in the capacity or distribution of the air conditioning system, he said.

The days of moisturizing the air by wetting the floor with a hose or by mechanically spraying moisture into the air are over, Mr. Davidson said. Recent years have brought several new engineering developments, among which are the unitary and central station systems of air conditioning, electrostatic filters, the elimination of windows in factories, changes in wall structures and insulation techniques, refrigeration and several others, he said.

"Thermodynamically, there is no difference between a unitary and central station system," he pointed out. "The accurate difference is in the size only. The increased operating efficiency and decreased maintenance cost of a central station will compensate for the increased capital cost of the central station and its apparatus room," he said.

The problem of cleanliness, Mr. Davidson revealed, has given rise to electrostatic filters. Cotton fabrics which go through a drastic bleaching and finishing process are free from industrial air dirt unless they are soiled during the spinning process.

"Rayon and other synthetic fabrics," he said, "do not go through such finishing processes and soil or dirt introduced in the fabric in the weave room is not removed in the finishing process. The result is a 'second' or inability to produce a pastel or light shade fabric." Electrostatic filters are more readily adaptable to central station systems, he said.

The third air conditioning innovation, the elimination of windows, is a more revolutionary one, Mr. Davidson declared. "From a functional point of view, windows have only two excuses for existing—light and ventilation or cooling," he said. Daylight construction failed to give the light required as measured by today's standards. The sunshine produced so much glare that shades had to be provided or windows painted. The volume of air that a modern textile mill requires for cooling is impossible to obtain through open windows. Therefore, windows fail in their only two functional reasons for existence, he stated.

Modern mills should be built without windows, he said, and existing mills should do away with them by bricking, since it is impossible to control "within the desired tolerances," the temperature and humidity in areas adjacent to them.

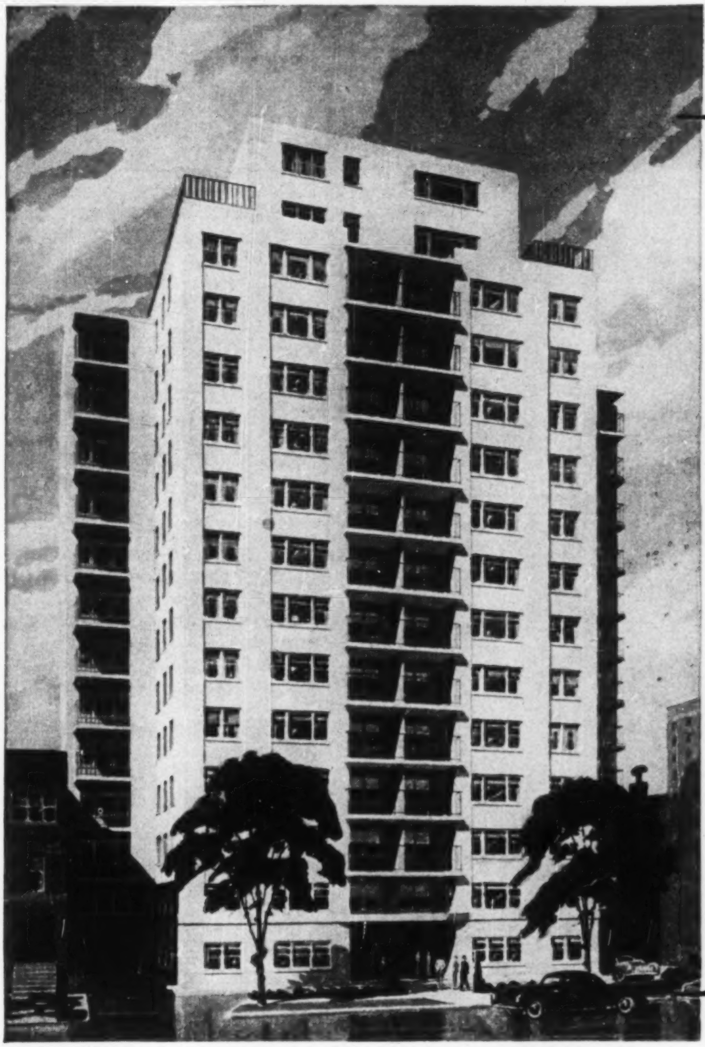
He indicated that this latter point is important because the strength of cotton fiber, for example, is approximately 50 percent greater, the elasticity 20 percent greater and the strength before rupture more than double at 75 percent relative humidity than at 40 percent. Beyond a relative humidity of 75 percent the strength falls off and the elasticity increases rapidly, so windows which interfere with temperatures by drafts and humidity by condensation should be eliminated.

Wall construction and insulation give rise to the problem of heat loss and gain, Mr. Davidson asserted. From this standpoint, he explained, a 13 in. brick wall would be perfectly satisfactory. Seasonal temperature changes, however, determine whether or not insulation is required to prevent condensation. Insulation is most important where exposed structural steel elements might result in excessive heat loss and condensation.

Mr. Davidson gave three reasons to justify the expense of insulation: it dampens out the variable sun load effect on the roof, in many cases it is necessary to prevent condensation, and in the case of a wood roof, which is impossible to vapor seal from the inside, condensation and eventually deterioration is often experienced within the wood planks themselves.

He said refrigeration has gained increasing importance during the last few years for the maintenance of constant temperatures. This has been motivated by the fact that the increased efficiency of machines is brought about by refrigeration, he declared, citing the following:

"In a 600 XD Draper loom mill operating on rayon fabrics with a thoroughly modern central station humidifying system, loomstops ranged from 2.3 to 5.4 per producing loom hour. The loom efficiencies averaged 92.6 and second quality ranged between 15 percent and 16 percent. When refrigeration was added to this unit, the loomstops over a range of two months were from 1.2 to 2.9 and efficiencies averaged 96 plus percent with the second quality dropping to a range between four percent and seven percent. When the refrigeration was stopped for adjustment, it was found that loom stoppage and efficiencies almost immediately reverted very close to the original findings."



15-STORY

APARTMENT BUILDING HEATED BY REVERE COPPER RADIANT HEATING COILS EMBEDDED IN CONCRETE FLOORS

1350 Astor Street, Chicago. Ralph C. Harris, Architect; Bueter & Wolff, Engineering Consultants; Gallaher & Speck, Inc., Heating Contractors; The Davies Supply Company, Revere Distributor.

ACCORDING to recent building reports, the "Gold Coast" in Chicago has been chosen for the location of several very fine, new apartment buildings. Among them is 1350 Astor Street.

One of the interesting features of this outstanding building is that apartments on all fifteen floors will have the comfort and convenience of radiant panel heating. The heating coils are imbedded in the concrete floors. They utilize over 52,000 feet of Revere Copper Water Tube . . . nearly two-thirds of a mile of tube per floor.

From the beginning of the installation throughout a lifetime of service, Revere Copper Water Tube is ideal for radiant panel heating. Long lengths of this lightweight, easy-to-bend tube—the joints made with solder-type fittings—reduce the time and cost of installation. And experience has clearly proven that you can rely on this tube for long years of trouble-free service.

All Revere Copper Water Tube is stamped at regular intervals with the Revere name and the type as your assurance of top quality.

Revere materials including Copper Water Tube and Red-Brass Pipe—are available through leading distributors in all parts of the country. The Revere Technical Advisory Service is always ready to serve you. Call your Revere Distributor.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801
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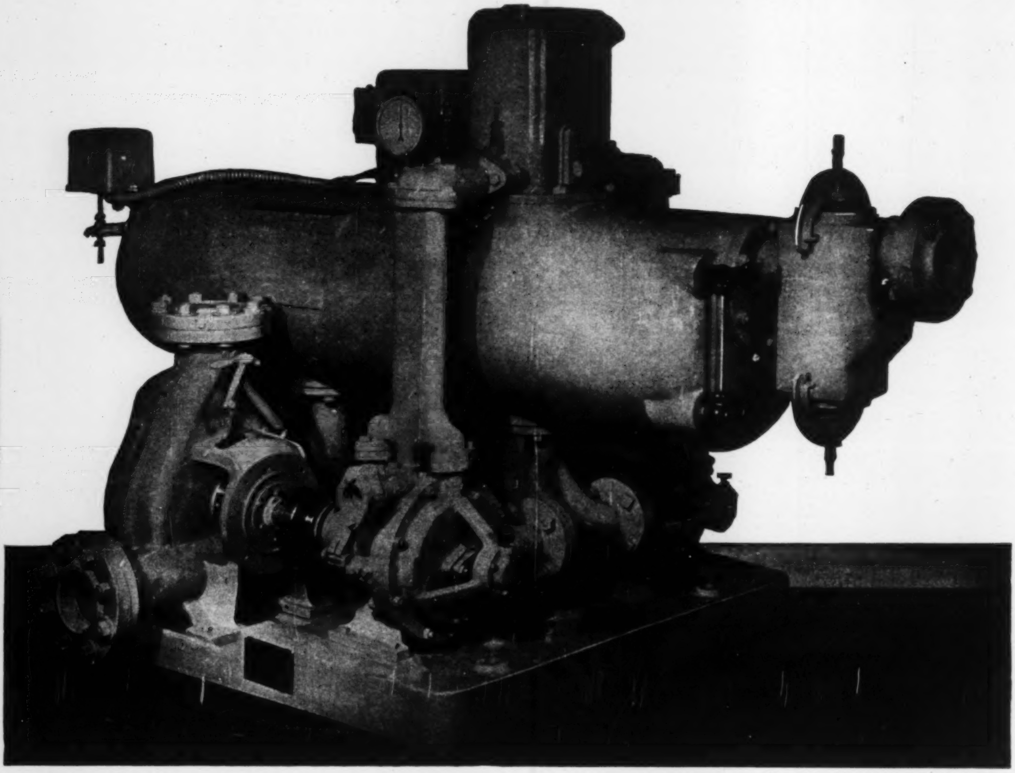
Mills: Baltimore, Md.; Chicago, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y.
Sales Offices in Principal Cities, Distributors Everywhere.

Where Heat Must Not Fail—
Install this SAFE Heating Pump!



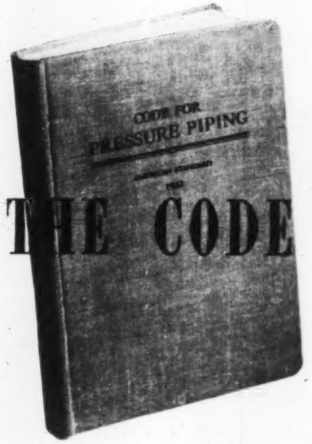
In Hospitals, Greenhouses, Schools, Public Buildings, Theatres, wherever heating systems must not fail, install the Nash Vapor Turbine, for it is entirely independent of electric current failure, and continues to operate as long as there is steam in the system.

More than that, the Vapor Turbine is a most economical pump, for the elimination of electric current does away with current cost, the largest single item in the operation of an ordinary return line heating pump.

Greater savings still are effected by the Vapor Turbine in the system, for the reason that this pump operates continuously. It is the only pump that can do this with economy. Continuous operation means uniform circulation, and uniform circulation saves steam.

The Nash Vapor Turbine has but one moving part, rotating in the casing without metallic contact, and requiring no internal lubrication. Quiet, compact, and troubleproof. Bulletin A-290 is free on request.

THE NASH ENGINEERING COMPANY
SOUTH NORWALK, CONNECTICUT, U. S. A.



THE CODE FOR PRESSURE PIPING

How It's Being Revised

As has been announced by the American Standards Association and the American Society of Mechanical Engineers, sectional committee B31 was reorganized in the fall of 1948 and has been engaged since in revising the American Standard Code for Pressure Piping, ASA B31-1942. The present code was published in 1942, with supplements 1 and 2 following successively in 1944 and 1947. Continuing increases in the severity of service conditions, with concurrent development of new materials equal to meeting these higher requirements, have pointed the need for more extensive changes in the code than can be provided by supplements alone—hence, the decision to produce a revised code during 1950, with a more comprehensive revision to follow about 1952.

The present article deals with the reorganization of sectional committee B31 to carry out this assignment, the scope of the code, and the general nature of the contemplated changes.

Since it was first organized in 1926, sectional committee B31 has operated under the procedure of the American Standards Association with the American Society of Mechanical Engineers as the sponsor. During the first 20 years of its existence, the sectional committee retained much of the same personnel and operated with a definite continuity. In approaching the present task, however, it became apparent that the old membership had in part disappeared or was out of touch with developments in this field. The decision was therefore reached to reorganize the sectional committee and its several subcommittees, and to invite the various interested bodies to reaffirm their representatives or to designate new ones. The new organization is now functioning smoothly toward getting out a revised code.

Organization Structure and Personnel

The large membership of the sectional committee constitutes every reasonable cross section of public interest, with the members themselves outstanding in their respective lines. Because of the wide field involved, some 30 to 40 different engineering societies, government bureaus, trade associations, institutes and the like have had one or more representatives on the sectional committee, plus a few "members at large" to represent general interests. In addition to active voting members on subcommittees, there are a number of "corresponding members" who receive mailings and who are free to comment if they so desire. Interesting though it would be, space does not permit listing here all the different bodies participating, with the names of their individual representatives. This portion of the article will be confined to the organization structure with the names of the officers of the sectional committee and its subcommittees and their business affiliations.

In addition to an executive committee consisting of the officers of the sectional committee and subcommittee chairmen plus a few members at large, there are three groups of subcommittees. The first group of subcommittees, numbered

HEATING, PIPING & AIR CONDITIONING takes particular pleasure in publishing this article (especially prepared for our January issue) on how the American Standard Code for Pressure Piping, which was first issued in 1942 (with supplements in 1944 and 1947), is being revised. It not only explains the organizational setup for writing the new code, but gives detailed information on the changes proposed and being considered. Sabin Crocker—an authority in the field, vice chairman of the committee, and a member of HPAC's board of consulting and contributing editors—has compiled this progress report on behalf of the sectional committee which is revising this important code

1 to 5 inclusive (see list), is responsible for revising the respective sections on piping systems for different industries. The second group—consisting of subcommittees numbered 6, 8, 9 and 10—is charged with preparing material that can be used in common by several of the first group of subcommittees through reference to supplementary chapters. Subcommittees 7 and 11, as explained later, serve the special functions of editing and of interpretation of the code in response to inquiries, or of liaison with other code and standards formulating bodies. The executive committee establishes policies, reviews the work of the other subcommittees, arranges publication and distribution of the code, and acts in general as the administrative agent of the sectional committee.

The sectional committee officers are:

Chairman—F. S. G. Williams, manager, Eastern sales, Taylor Forge and Pipe Works.

Vice Chairman—Sabin Crocker, mechanical engineer, Ebasco Services, Inc.

Secretary—L. W. Benoit, general secretary, Manufacturers Standardization Society of the Valve and Fittings Industry.

The subcommittees and their chairmen are:

Subcommittee 1 on Power Piping Section—E. J. Wiseman, mechanical engineer, Stone and Webster Engineering Corp.

Subcommittee 2 on Gas and Air Piping Section—H. D. Hancock, president, Gas Advisers, Inc.

Subcommittee 3 on Oil Piping Section—R. D. Lepley, engineer in charge of technical div., Atlantic Refining Co.

Subcommittee 4 on District Heating Piping Systems Section—G. D. Winans, assistant superintendent of central heating, Detroit Edison Co.

Subcommittee 5 on Refrigerating Piping Section—A. C. Buensod, president, Buensod-Stacey, Inc.

Subcommittee 6 on Fabrication Section—G. Sindig-Larsen, vice president, Pittsburgh Piping and Equipment Co.

Subcommittee 7 on Coordination (Editing and Interpretations)—H. A. Wagner, chief mechanical engineer, engineering dept., Detroit Edison Co.

Subcommittee 8 on Materials and Stresses—J. J. Kanter, materials research engineer, Crane Co.

Subcommittee 9 on Standards and Identification—L. W. Kattelle, assistant chief engineer, Walworth Co.

Subcommittee 10 on Instrument Piping—R. E. Sprenkle, hydraulic engineer, Bailey Meter Co.

Subcommittee 11 on Liaison with Other Codes and Standards—C. A. Kelting, assistant division engineer, Consolidated Edison Co. of New York.

Consideration also has been given to the need for another subcommittee to formulate a new section on process piping for the chemical and allied industries. It was concluded, however, that the subject is too complex with respect to pressure, temperature, corrosion and other chemical reactions to permit formulating a set of requirements at this time that would be of practical value.

Scope and Intent of the Code

As defined by a special committee and confirmed by the American Standards Association, the scope of the code is defined as: "Design, manufacture, fabrication, test, installation, and operation of pressure piping systems." As established heretofore in the several sections of the code, certain piping is excluded if operating at pressures below some stated minimum or if located outside of areas to which the code requirements apply. The scope is confined to piping as such to the exclusion of equipment and pressure vessels to which the piping is connected. The code is intended to set up minimum safety requirements as distinguished from specifying what constitutes good design; hence, it is written in either mandatory or permissive language rather than advisory.

In addition to its work of coordinating the several sections of the code and editing new material, subcommittee 7 serves to process inquiries received from industry concerning the scope and intent of the code. As would be expected, frequent inquiries come in concerning special problems encountered in piping practice where an interpretation or amplification of code requirements is desired. If the answer is readily apparent in the light of previous discussion within the sectional committee, or if a governing policy has already been established, subcommittee 7 can formulate a reply for transmittal by the secretary of the sectional committee. Otherwise, the inquiry may need to be referred to the executive committee or to the subcommittee responsible for the code section involved for investigation and report.

Where circumstances permit quick action by the subcommittee concerned, an early reply is given the questioner. In other cases for which no ready answer is apparent, the points at issue may have to be discussed by the executive committee and its conclusions referred to the sectional committee for confirmation before an answer beyond a mere acknowledgment can be given. Questions and rulings of general interest will be published from time to time for the benefit of all concerned.

It is hoped that this procedure will enable the code committee to serve a useful purpose as a board of review for troublesome problems and at the same time serve to keep the code abreast of developments during periods between republication. To facilitate processing and secure a prompt reply, inquiries should be addressed to L. W. Benoit, Secretary, ASA Sectional Committee B31, c/o Manufacturers Standardization Society of the Valve and Fittings Industry, 420 Lexington Ave., New York 17, N. Y. Likewise, any comments concerning the proposed revisions mentioned in this article should be addressed to Mr. Benoit.

Section 1—Power Piping

Among the principal changes being considered for section 1 on power piping systems are the following:

Table 1, List of Material Specifications: Delete reference to ASTM A96 for alloy steel bolting because this specification has been discontinued by the ASTM and the corresponding grades provided in A193 where they are identified as BA, BB, and BC. Include the following additional ASTM specifications: A261, Heat Treated Carbon Steel Bolting Material; A307 (Grade B) Steel Machine Bolts, Nuts and Tap Bolts which is a new specification similar to MSS SP-39; A315 for Seamless 1 Percent Chromium 0.5

Percent Molybdenum Alloy Steel Pipe; A213 Grades T-21 and T-22 Alloy Steel Boiler and Superheater Tubes; B-111 for Copper and Copper Alloy Seamless Tubes and Ferrule Stock.

Reword paragraph 105(b) to read as follows: "Should it be desired to use any materials or methods of construction not now covered by this code or which may be developed in the future, it is intended that the manufacturer shall provide details of design and construction which will be as safe as otherwise provided by the rules in the code. Where it is desired to use materials not included in table 1, written application shall be made to the committee fully describing the proposed material and the contemplated use, requesting that an allowable stress (*S* value) be assigned."

Paragraph 105(c): Change 1000 F to 1100 F as the maximum limiting temperature for this section of the code.

Table 3(a) for Allowable Stresses (*S* values): Add values for 1050 F and 1100 F using the values now shown in Table P-5 of the ASME Power Boiler Code for the respective materials. Also, include the full range of values for A213 and A315 as noted above, plus A158 Grade P11 and A280. Add a note of caution concerning the danger of graphitization where welded construction is used in the following steels at temperatures in excess of those noted: carbon steel, 775 F; carbon-molybdenum steel, 875 F; chromium-molybdenum (with chromium under 0.60 percent) steel, 975 F.

Paragraph 121(a): Revise to require that steel fittings and valves shall be capable of withstanding before erection the hydrostatic test pressures as given in supplement No. 1 to the American Standard for Steel Pipe Flanges and Flanged Fittings (ASA B16e) for the proper material, pressure standard and facing involved.

Paragraphs 121 (b) and (c): It is proposed to revise these paragraphs to read as follows:

"(b) After Erection. All piping systems shall be capable of withstanding a hydrostatic test pressure of one and one-half times the design pressure, except that the test pressure shall in no case exceed the adjusted pressure-temperature

Ventilation at Big New Plant

THIS COMPACT concentration of black oxide finishing tanks in the plating department at A. B. Dick Co.'s new plant at Niles, Ill., illustrates the ease with which engineers of the Austin Co., which designed and built the structure, were able to accommodate materials handling and other building equipment on the standard structural framework. The traveling monorail bridge in this area facilitates the handling of loaded tumbling baskets from bath to bath.

All of the exhaust pipes serving the tanks on both sides of the aisle are vented through a single manifold with a power driven exhaust fan on the roof, while outdoor air is provided through a ventilating outlet directly above the bus duct.

Ventilation of the plant is controlled by 43 standard factory-built heating and ventilating units, mounted singly and in groups of two, three and four on platforms which fit into the standard building trusses. These units, each of which handles 14,400 cfm of air and which have heating capacities up to 1½ million Btu per hr, provide frequent air changes throughout the plant. While the units in the various departments have been designed to supply different amounts of outside and recirculated air in cold weather, depending upon departmental requirements, all are equipped to operate entirely with outside air, which reduces the temperature in warm weather. These facilities are supplemented in the summer by an evaporative cooling system, with pipe from which water is sprayed across 11 acres of roof in the plant and office buildings.

All of the dust, heat and fumes created by the many metalworking and processing operations necessary in the manufacture of duplicating machines are removed at their source, so that uniformly good atmospheric conditions can be maintained in these departments without isolating the operations in separate rooms. Permanent partitions, however, enclose the large stencil and ink manufacturing departments.

The two story office building is air conditioned.

rating for 100 F as given in supplement No. 1 to the American Standard for Steel Pipe Flanges and Flange Fittings (ASA, B16e) for the material and pressure standard involved. For systems joined wholly with welded joints the adjusted pressure rating shall be that for ring joint facing. For systems joined wholly or partly with flanged joints the adjusted pressure rating shall be that for the type of facing used.

"(c) The hydrostatic test after erection shall be applied wherever practicable and shall be in accordance with section 6, par. 630 of this code. In no case shall the test pressure be less than 50 psi nor shall it be made with a test medium having a temperature in excess of 100 F."

Paragraph 145 (a): Revise to permit designing boiler feed piping to conform to the adjusted pressure temperature ratings given in supplement 1 of ASA B16e instead of the original 1939 ratings.

Consideration also is being given to modifying the requirements for boiler blowoff piping and trap discharge piping.

Section 2— Gas and Air Piping

Subsequent to the issuance of the Code for Pressure Piping as an American Standard in 1942, section 2 on gas and air piping systems has been periodically reviewed to test the suitability of its provisions as new materials and methods of construction have been developed and further operating experience obtained. After analysis and correlation of such reviews, subcommittee 2 on gas and air piping has formulated and recommended to the sectional committee a number of proposed revisions, the more important of which are as follows.

In supplement No. 2 (B31.1b-1947) a single formula was substituted for the two pipe wall thickness formulas previously appearing in several sections, other than section 2. While section 2 has heretofore included formula 3 only for computing the wall thickness of pipe within the scope of section 2 (div. 1), it is deemed advisable to change that formula to the form now provided in other sections of the code. Accordingly, it is proposed to revise formula 3 in the forthcoming edition as follows

$$t_m = \frac{PD}{2S + 0.8P} + C \quad \ldots\ldots [3]$$

Due to the discontinuance of several material specifications and the issuance of new specifications, extensive revisions have been proposed in tables 5 and 6. For example, specifications ASTM-A96, ASTM-A136, ASTM-A137 and ASTM-A138 have been discontinued and ASTM-A193 and API 5-LX have been issued. Several specifications of materials infrequently used have been deleted. It has been the objective to include the material specifications which are extensively used for the services which are within the scope of section 2 and which by their listing will contribute to the application of the code.

The revision proposes new requirements for pipe (except cast iron pipe) in gas and air compressing station piping systems which will result in thicker pipe walls, other factors being equal, than presently required by the code. It also provides that pipe, other than cast iron pipe and nonferrous tubing, in piping systems within the scope of section 2 (div. 2) shall be capable of qualification for maximum allowable working pressures at least equal to the pressures prescribed for pipes of various yield strengths.

The present code classifies the pipe (except cast iron pipe) in piping systems within the scope of section 2 (div. 2) in two broad groups as follows: (1) that which has been mill tested subsequent to the official adoption of the code in accordance with par. 222 (c), and (2) that which has not been so mill tested. The latter group is inclusive of pipe manufactured and/or mill tested prior to the official adoption of the code and it is not proposed to change the basic code provisions in respect to such pipe. The latter group also includes pipe manufactured subsequent to the official adoption of the code but not mill tested in accordance with par. 222 (c) and it is proposed to provide in the forthcoming edition that the maximum allowable working pressure for such pipe be not determined under formula 8 or as a percentage of the mill test pressure as at present but under one of several optional provisions which are related either to mill test pressures or to stated percentages, for the several described conditions, of values computed under formula 8.

It is proposed to delete tables 7 to 11, inclusive, on specific requirements. These tables were appended in the 1942 edition for the purpose of summarizing the cross references and specific requirements. Recent discussions have indicated lack of sufficient interest in and utilization of these tables to justify their inclusion in the proposed new edition.

Section 3— Oil Piping

In formulating changes to the section on oil piping, subcommittee 3 found it desirable to clarify paragraphs 301 on scope and 302 on classification, which it proposes be restated as follows:

"301 Scope

"Section 3 of this code covers minimum requirements and recommended practices for the design, manufacture, test and installation of oil piping systems and the component parts of such piping including, for example, the pipe, flanges, bolting, gaskets, valves and fittings; used in the production, transmission and refining of petroleum. It is not intended to include casing, tubing, or pipe used in gas or oil wells, well-head assemblies, oil and gas separators, crude oil production tanks and lines interconnecting these facilities. It is intended to include gas gathering systems, gas return systems, and crude oil gathering systems in oil fields only when they are within the boundaries of cities or villages but not within sparsely populated or rural territories which are within the legal boundaries of cities or villages. This section shall apply to oil transmission lines, refinery piping systems (except those covered by the ASME Power Boiler Code) and piping in bulk plants, compounding plants, loading terminals, and gas processing plants. Oil and gas production piping systems outside the boundaries of cities and villages are not covered by this code.

"302 Classification

"(a) Piping Systems covered by this section are grouped into two divisions A and B as follows:

"Division A includes:

"1) Refinery process piping systems including air, water, steam, oil and gas.

"2) Refinery distribution systems,

between storage tanks and processing areas, including air, water, steam, oil and gas.

"3) Gas processing plants (not gas manufacturing plants).

"4) Piping systems of bulk plants, compounding plants and loading terminals.

"5) Gas gathering systems, gas return systems, and crude oil gathering systems within the boundaries of cities and villages.

"6) Oil transmission lines within cities and villages, and within refinery limits.

"Division B includes:

"1) Oil transmission lines outside of cities and villages.

"Within the body of this section, requirements applying to only one of these divisions will be clearly noted.

"(b) All piping within the limits of the boiler house or boiler house areas shall conform to section 1 of this code.

"(c) This section of the code includes piping, valves and fittings up to the connections of drums, pressure vessels and apparatus, and up to the terminal fittings of furnaces, interstage piping between compressors or duplex pumping equipment, etc., but does not include (1) the connections themselves, which are ordinarily furnished with and as a part of the equipment; (2) the piping exposed to flame in furnaces; (3) internal piping or its parts integral with the equipment or apparatus.

"(d) Oil lines are classified according to pressure and temperature. Oil vapor lines shall follow the same classifications and specifications as oil lines. The specific requirements or recommendations as to material and dimensions are given in tabular form under classes 1 and 4, inclusive, tables 28 to 31. Tables 27 and 31—class 4 apply only to division B."

Among the other important changes proposed for this section are:

Paragraph 325, Thickness of Pipe: While the modified Barlow formula used in the 1942 edition of the piping code will be retained as an alternate, it is proposed to include the modified Lamé formula as the primary basic formula for wall thickness in this section of the code as well as in the sections on power, district heating, and refrigeration where it appeared in supplement No. 2 issued in 1947. The modified Lamé formula reads as follows with symbols as defined in the 1942 code:

$$t_m = \frac{PD}{2S + 0.8P} + C$$

Tables 16, 17, 18 and 19 on pages 76-79 of the 1942 code will be revised to agree with the new pressure-temperature ratings given in supplement No. 1 of B16e-1939.

Table 27, Allowable Stresses (*S* values), will have values added for API 5LX pipe and other materials as required to meet recent developments.

Paragraphs 309-312 inclusive on valves are being rewritten and rearranged. It is proposed to permit

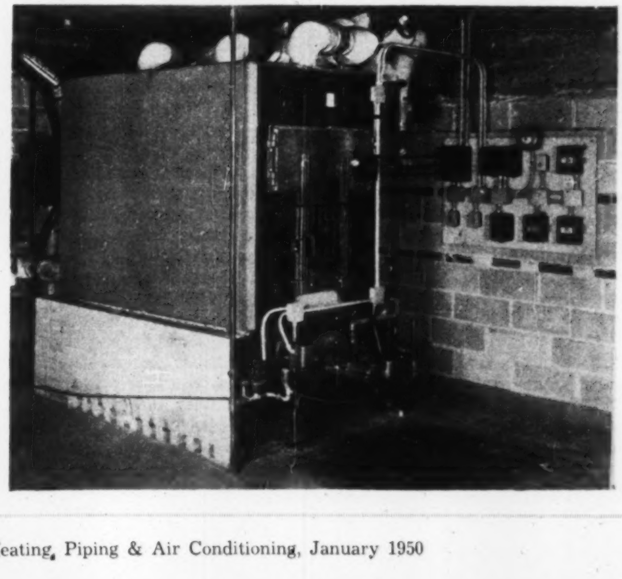
Boiler Installed in Pent House

WHEN A DRUGGIST signed a lease for a store in a new building which was only in the design stage—and requested maximum basement storage space despite blueprints calling for only a partial basement—a prescription for more space had to be adequately compounded by the owner, architect, consulting engineer and heating contractor. The solution was found by installing the heating boiler, oil burner and domestic water heaters in a small pent house on the roof of the two-story Leu building, University City, Mo.

While a construction materials hoist was standing, the heating contractor C. J. Moritz Heating Co., St. Louis, had the sectional heating boiler raised to the roof. One of the problems involved was to prevent excessive heat loss and possible fire hazard due to heat radiated from the bottom of the refractory combustion chamber provided for the oil burner. Harry F. Wilson, consulting engineer, suggested a specially constructed insulated foundation to prevent undue loss of heat to the floor. Hollow tile was laid on the pent house cement floor and covered with a course of firebrick. This provided a rigid, insulated foundation for the boiler and combustion chamber, yet allowed free passage of air for ventilation.

An induced draft fan was installed; this permitted adequate draft with a 7 in. stack extending but 5 ft above the roof.

The problem of returning condensate to the boiler was solved by installing a pump in the basement. A 2000 gal below-ground tank buried adjacent to the building stores the No. 5 fuel oil for the burner (photo courtesy National Radiator Co.)



the use of block valves between pressure vessels and their relief valves only where such use is sanctioned by the API-ASME or the ASME unfired pressure vessel code, whichever applies.

Section 4— District Heating Piping

No extensive revisions in the section in district heating piping are contemplated. The only major change is to drop paragraphs 435-444 inclusive dealing with steam pressures below 125 psi. The various tables throughout the section will be revised to eliminate reference to obsolete specifications and to list others that have become available since the last revision. As many of the requirements of this section are practically the same as the power section, subcommittee 4 has concentrated on the items that are different and will follow the power section in correlating parts that are similar.

Section 5— Refrigeration Piping

The section on refrigeration piping systems made its first appearance in the ASA B31 code for pressure piping in its 1942 edition. A section on refrigerant piping also appears in the ASA B9 standard for mechanical refrigeration. It has been the aim of both these ASA committees to keep their sections on refrigerant piping identical. There is an indication, however, among the members of these committees that the aims of both codes will be best served if the requirements for refrigeration piping appear in the piping code only and are covered by reference in future editions of the code for mechanical refrigeration. Since both committees are now in process of revising their codes, this is an opportune time to work at such an arrangement. This section of the piping code will cover the design, manufacture and installation of a refrigeration piping system but the tests and safety precautions required for operation of the piping system will be contained in the ASA B-9 safety code for mechanical refrigeration.

In the revisions of this section of the code for pressure piping, it is the intention of the committee to incorporate all of the newly adopted material specifications, which it is hoped will include such material specifications as are suitable for low temperature refrigeration duty. A general revision of the specific minimum thickness requirements for refrigerant pipe and tubing is to be suggested, bringing this section of the code up to the standard prevailing practice of today.

Section 6— Fabrication

Several important changes and additions are contemplated in the section on fabrication, among which are:

A rather completely revised chapter on hangers and supports.

A revised chapter on welding which will embody the uniform welding rules sponsored by the American Welding Society.

Revised rules for reinforcing welded branch connections.

A general revision of the expansion and flexibility requirements.

Requirements covering brazed and soldered joints as applied to nonferrous tubing and fittings. Consideration also is being given to rules for welding nonferrous materials.

Materials for Piping

In previous editions of the piping code there has been a separate section 7 on materials, their specifications and identification. Presenting this material in a separate section constituted a duplication in that applicable specifications also were listed in the other code sections for various piping systems. Hence, it has been decided to eliminate section 7 as a separate entity but to have this subcommittee continue in an advisory capacity to assist the other subcommittees with their listing of appropriate material specifications.

Materials and Stresses

Subcommittee 8 on materials and stresses has been cooperating with the boiler code committee, the joint ASME-ASTM committee on the effect of temperature on the properties of metals, and other interested bodies with a view to coordinating the allowable stresses (*S* values) at different temperatures as listed in their respective codes. As in the case with the listing of appropriate materials specifications, this information will appear in the several sections of the piping code rather than in a separate section of its own.

Since the previous code was published in 1942, several new specifications have become available for materials for use at subatmospheric temperatures as well as for high temperature service. In the meantime, steam operating temperatures have advanced into the range of 900 to 1100 F so that considerable activity has developed for new materials at both ends of the temperature scale. Although the same basic data and formulas are used in all sections of the code insofar as possible, nevertheless considerable latitude is allowed the several subcommittees in setting their own allowable stresses, safety factors, and temperature limitations for various materials to conform with what has been found to be safe practice within their respective industries.

Instrument and Control Piping

When supplement 2 of the 1942 code came out in 1947, it contained requirements on instrument and control piping for the first time. These requirements appeared as additional paragraphs in the several sections on the different kinds of piping systems with appropriate variations for the respective services. As originally issued, it was to be expected that the rules for instrument and control piping would be somewhat incomplete and in need of clarifying and amplifying when republished. Hence, the current effort has been largely directed at correcting deficiencies that developed when the initial rules were given a field trial.

Inclusion of a selection chart is contemplated with properly designated scales for the selection of tubing and fittings in accordance with actual line pressures and temperatures. Further clarity will be given to what constitutes "dead end" conditions by segregating specific items such as take-off connections, reservoirs, and shutoff and meter valves into individual code items, with separate requirements for each. Due attention will also be directed to the necessity for preventing damage to the main steam lines through the heating up or vaporizing of the return cold water from flow meter instrument lines whenever a flow rate change occurs.

One of the chief criticisms leveled at the original requirements for instrument piping was the lack of specifications covering flared and compression type fittings. It is proposed to remedy this deficiency by designating safe, reliable fittings currently available which do conform to the Army-Navy code, which is standard in those industries operating at elevated pressures and temperatures, and to the SAE codes for lower operating conditions.

Liaison With Other Codes

In concluding this article, attention is called to the continuing effort that is being made by all subcommittees to tie in with other codes for mechanical equipment, boilers, pressure vessels and the like in their respective fields. Also, the code calls for the use of standardized dimensions and materials for pipe, valves, and fittings as established by the American Standards Association and the American Society for Testing Materials, or by other recognized bodies in a particular field—such as the American Petroleum Institute or the American Society of Refrigerating Engineers.

A subcommittee on liaison with other codes and standards has been set up to take over the work of the former ASME joint conference committee on piping codes and standards together with similar contacts with other bodies. The function of the liaison committee is to work toward a unification of piping requirements where the jurisdiction of more than one code is involved, as is the case where the ASME boiler code contains requirements for piping which, for operating reasons, go beyond the boiler proper and the first stop valve associated therewith. Wherever one of the subcommittees responsible for a section of the B31 piping code encounters problems associated with the overlapping jurisdiction of another committee outside the B31 group, these problems will be referred to the liaison committee for discussion with others concerned in an effort to secure the mutual adoption of identical requirements (insofar as possible).

AUTOMATIC CONTROLS STANDARD FOR SHIPS

INSTALLATION OF automatic temperature and air conditioning controls on virtually all classes of ships will soon be standard practice.

M. F. Rather, vice president in charge of eastern district and export operations in New York for Johnson Service Co., recalls that a few installations were made prior to 1941 on passenger liners operating between the United States and Europe, but it was under the impetus of war that the use of automatic temperature control aboard ship became really widespread. In cargo and supply ships, especially those carrying perishable goods and operating for extended periods under adverse climate conditions, the need for extensive installations of automatic temperature and humidity control equipment became apparent. Similar need was recognized for transports, all types of navy craft and hospital ships.

Architects and engineers of cargo and naval vessels have been quick to make use of automatic temperature regulation as a matter of operating efficiency, according to Mr. Rather. In addition to this, in passenger ships, they have found that supplying travellers with the same selective air conditioned comfort at sea as ashore gives a definite advantage in the highly competitive travel market.

The latest luxury liner to provide this ultimate in comfort for her passengers is the French Line's Ile de France, which returned to service this summer after $25 million worth of face-lifting and general refurbishing.

QUESTION OF THE MONTH

YOU ARE INVITED *to answer the following question from a reader of HPAC. Suitable comment on the matter will be welcomed and —space permitting—will be published and paid for at regular rates. Sketches and photos are particularly desired. Address the Editor, Heating, Piping & Air Conditioning, 6 N. Michigan Ave., Chicago 2.*

"What type or types of air conditioning systems would be most practical and satisfactory for the top 20 floors in an existing 21 story office building? The building is about 80 ft wide by 115 ft long, with all sides exposed.

"There are two opposing banks of four elevators each in the center of the second and third bays from one end. There also is a closed stairwell, a freight elevator, and utility service shafts. Windows with venetian blinds take up about 35 percent of the wall area on all sides. The floors are partitioned off differently into various sizes of private and general office spaces, and with all possible exposures except a combination of east and south since the southeast corner rooms are used for washrooms.

"Heating is now being done by a two pipe orificed steam system with cast iron radiators at every window. The building is in a downtown district at about 40 deg latitude."—G.B.

How Air Conditioning Has Developed in Fifty Years

MODERN AIR conditioning started in the textile industry. Textile fibers differ from people in that their regain of moisture to re-establish their best condition is a function of the moisture content of the air related to temperature—or, more accurately, the relative humidity—much more than it is a question of dry bulb temperature. In other words, cotton, silk, wool—and wood, paper, leather, etc.—all bear different but normal moisture contents at a definite relative humidity and over a wide range of dry bulb temperatures. So long as the relative humidity remains constant, the moisture content of a particular material remains constant.

Adding moisture to the air to facilitate the manufacture of goods dates back more than 100 years and the method used then is by no means obsolete. It consists of spraying into the atmosphere finely divided particles of water. This exposes large amounts of surface to the air and the water is readily evaporated to raise the moisture or vapor content of the air and thus to raise the relative humidity or vapor pressure of the atmosphere. Many types of atomizing heads have been—and are—used.

In most every instance, the necessity for this additional moisture is a winter requirement. The moisture must be added to the surrounding air in order to insure not only properly finished goods but to make it possible to operate without too much breakage or too much static electricity. The colder the winters, the greater the necessity for adding moisture—and as our textile manufacturing was mostly in New England, the use of moistening heads in the New England mills was the largest outlet for so-called air conditioning. Summertime control of temperature and humidity was not considered essential in these early installations.

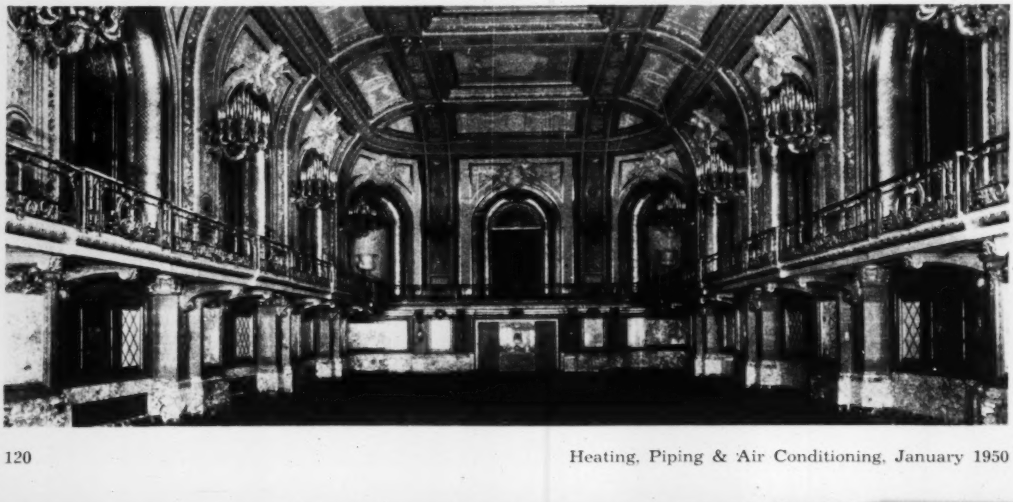
Central Station Air Conditioning

Larger mills with more horsepower and more difficult heating problems brought about the use of fan systems of heating, and when it was discovered that the essential moisture for maintaining the relative humidity required to operate during the winter could be introduced with the warm air circulating system for heating a mill, central station air conditioning was on its way. This required a spray washer which rapidly would saturate (or nearly saturate) the air passing through it, and at the same time eliminate the free moisture not evaporated into the air.

The public today thinks of cooling as air conditioning, so let us assume that the change in the moisture content of hygroscopic materials (a winter condition) is adequately taken care of, and begin to consider simultaneous control of temperature and humidity—a relationship which involves refrigeration.

Actually, shortly after the turn of the century, cooled air was produced by means of refrigeration to be circulated by fans to produce comfort. A very elaborate system of cooling coils, ducts and controls, was a part of this installation and even the controls differed very little from our latest patterns and methods. This system was installed in the Congress hotel banquet hall in Chicago in 1907. Not long after this, the Blackstone hotel in the same city was equipped with a similar system, the source of refrigeration being carbon dioxide machines. In the period from 1904 to 1924, however, air conditioning was almost

Shortly after the turn of the century, an elaborate system of cooling coils, ducts and controls was installed to serve the Gold room of Chicago's Congress hotel



WALTER L. FLEISHER, consulting and advisory engineer, pioneer in air conditioning, and a member of HPAC's board of consulting and contributing editors, writes of the development of air conditioning since the turn of the century in this special article for our January 1950 issue. In the space available, he can touch only upon some of the high-spots. He could write a book —or several of them—on the subject, so close has he been to it

entirely done without refrigeration, and was almost entirely confined to industry.

Thus, except for the sporadic use of refrigeration, artificial cooling of air was practically unheard of before the first World War. Of course, ammonia refrigeration for the making of ice with slow speed reciprocating machines had been in use since the 1850's but the machinery was so big and clumsy and the fumes of ammonia were so difficult to efface or shield that the idea of using ammonia refrigeration for comfort air conditioning was hardly thought of. The hotels I have mentioned, dating back to 1907, used carbon dioxide as a refrigerant but anyone familiar with its high pressure requirements and its critical condensing temperature will realize why it was not generally utilized for air conditioning. The first theaters cooled artificially used carbon dioxide (or ice itself) as the refrigerant, and some of these installations are still in existence.

War and technology can produce anything—no matter what the cost —so in 1916 the largest air conditioning system ever projected up to that time was designed and installed for an ammonium nitrate plant. It probably advanced the use of refrigeration with washers more than anything developed before. If I can quote from memory, the capacity was about 750 tons of refrigeration and the cost $730,000—an unheard of sum up to that time.

Early Uses of Refrigeration

It is interesting to review some of the early attempts at air conditioning with refrigeration. The New York Hippodrome, erected in 1905 and with which I had something to do, installed refrigeration to make ice for their famous skating exhibitions. They then installed some bare coils over which to blow air, with the idea of cooling the air of the auditorium. The total refrigeration installed was about 100 tons, and in the light of today's requirements for the 6000 people the Hippodrome seated, with no recirculated air, it would have required 600 tons at least. The refrigeration was soon discarded for air cooling purposes, as its effect was negligible.

After 1918, air conditioning with refrigeration really started. There were many processes that could benefit from the control of temperature within the critical limits of the goods—matches, rotogravure, gelatins, films, candy, powder, pharmaceuticals, etc. Industry started to use refrigeration to cool water in air washers so as to maintain constant temperatures and humidities and definite relationships between them. And the moving picture theaters, because of the demand for summer performances, deserve a great deal of the credit for popularizing summer air conditioning.

A Billion Dollar Business

Air conditioning with refrigeration, which represents certainly 90 percent of the dollar value of air conditioning today, has to thank a number of basic developments for the possibility of extending it into the billion dollar business that I believe I was the first to predict in 1925.

Around 1911 and shortly thereafter methods of regulating the relative humidity by a knowledge of the relationship between the dew point and the dry bulb of the air were developed. Saturating the air in a washer at the desired dew point was the simplest way of accomplishing this result. A second major development was the discovery of a refrigerant that could be successfully used with high speed machines—a refrigerant that was non-toxic, not too expensive, nor too corrosive.

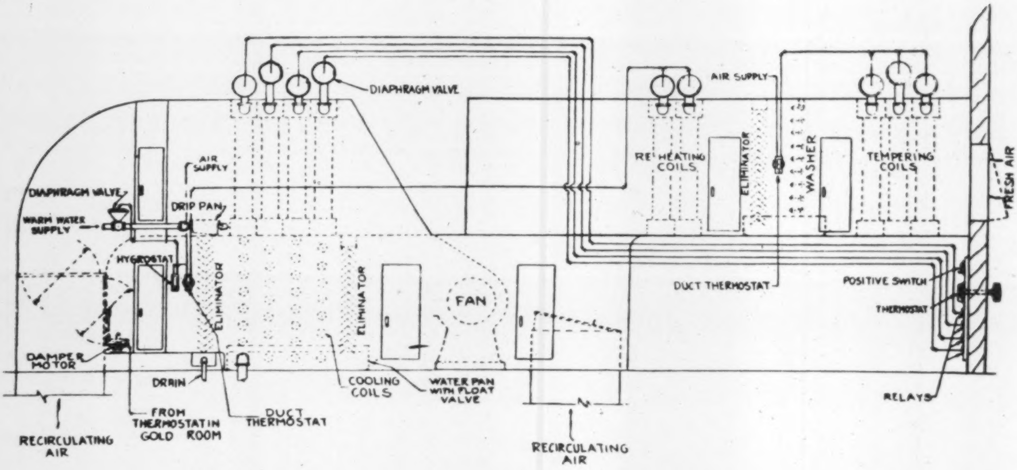
A third step in the rapid development of air conditioning was overcoming the prejudices of various health authorities on the recirculation of air for ventilation. Up to then—based on the primitive conception of carbon dioxide contamination being the basis of all evil —no recirculation had been permitted in public places such as schools, theaters, hospitals, etc., and as the allowable contamination required to overcome the objections of the authorities necessitated 30 cfm of outside or fresh air per person, that figure was established as the required amount for both children and adults in various places of assembly.

When the moving picture theaters decided to cool their houses in order to keep open in the summer, this 30 cfm requirement was such a burden that practically no refrigerated cooling could be done within economical limits. Out of this confusion, methods by which the recirculated air was bypassed around the conditioner were invented.

The Bypass Method Appears

I believe that the rational approach to the subject of cooling and dehumidifying as embodied in the bypass method had more to do with the rapid development of summer air conditioning than any one other thing. There are many reasons for this conclusion. It made air conditioning with refrigeration a well-known "comfort provider" at a time when the moving picture theater was the "summer home" for the stay-at-home. It established a relationship between sensible and latent heat of the human body. It established a rational approach to the required amount of fresh air for healthful conditions. And it was responsible for a great deal of money that went into research in connection with human reaction to our environment.

With the bypass system, only the amount of air necessary for ventilating purposes—approximately 10 cfm per person—had to be dehumidified and this air, coming from the dehumidifier or washer at a temperature slightly lower than the dew point to be maintained so



Method of air conditioning control installed at Congress hotel in 1907 (courtesy Powers Regulator Co.)

that it was in position to pick up the latent heat given off by the occupants, was reheated by air recirculated from the enclosure which already had approximately the temperature and moisture content essential for comfort.

The interesting fundamental principle of this method was that the variation in the number of people automatically adjusted itself between sensible and latent heat requirements and a decrease in the amount of air dehumidified in the conditioner was automatically compensated for by the additional sensible heat circulated through the fan, drawing air both from the enclosure and the dehumidifier.

About 40 percent of the air in these first comfort jobs was preferably taken through the dehumidifier and 60 percent recirculated around the dehumidifier. With a decreasing number of people, more and more air was recirculated, and by this recirculating or bypassing a saving of some 50 percent in the dehumidifying apparatus cost, and a decrease in refrigeration to 1 ton of refrigeration for 20 people as against 1 ton of refrigeration for seven people was obtained. This so-called bypass method dominated the comfort air conditioning field for 20 years.

The bypass method was followed by a method similar to the bypass method, but where the recirculated air was recirculated at the source—in other words, instead of having to take the air back to the conditioner in large volume, only that amount that was required for reconditioning was taken back.

This method was later improved upon by the introduction of the induced current air outlet. Even before the advent of such equipment, the injector method of inducing recirculated air from the enclosure had been used in theaters and other large spaces. However, the outlets made it possible to deliver air to the room at temperatures as much as 20 deg lower than the maintained condition in the enclosure, the outlets being designed to induce a current of air at, say, 80 deg from the room to mix with air at 58 deg in the outlet and to deliver without drafts air of a satisfactory dry bulb temperature.

Great Impetus Around 1925

The conditioning of theaters got its great impetus around 1925, and by 1931 or '32 about 300 of the major theaters in the country had been conditioned. Up to this time very few people had really understood or demanded summer cooling or conditioning but from this time on, the demand for comfort in the hot weather that prevails consistently through the United States created demand which was translated into dollars and the department stores and the railroads followed the theaters in rapid succession in adopting air conditioning.

The great growth of refrigeration was undoubtedly due to development of proper refrigerants for use not only in centrifugal machines but in reciprocating machines as well, which allowed high speeds in small units and was a dominant factor in the spread of air conditioning from the major jobs to the smaller jobs. Room units, store units and the various packaged units of all kinds were an outcome primarily of the proper refrigerant.

Technical Knowledge Spreads

There was one drawback in most of the period from 1900 to 1925 or 1930, and that was that there were only two or sometimes three or four engineering concerns in the air conditioning field.

The bypass method of cooling theaters or large places of assembly lent itself to rule-of-thumb methods. People being the major source of heat and moisture, and this loss or gain of heat and moisture being constant under sedentary conditions, the simplicity of figuring such enclosures was such that many came into the field without adequate knowledge of general air conditioning principles. As competition became greater, the air conditioning introduced into a great many of our enclosures became worse, until the consulting engineers who had been interested for so many years primarily in heating and ventilating recognized the necessity for a knowledge of air conditioning and took up the thermodynamics of air conditioning to become recognized preceptors in its development.

Chemical Dehumidification

There has been a great amount of research for something to take the place of or supplement refrigeration apparatus in air conditioning work. Out of this research have come the chemical dehumidifiers. The change from one state of moisture to another results, of course, in an increase in sensible heat which must be removed either by a water interchanger, refrigeration or some other means.

Dehumidification by this method has a very definite place in large air conditioning installations where the ventilating air (that is, the air from outdoors) can be dehumidified in a central system and brought to the point of utilization. This is mixed with air coming to this point above the dew point of the enclosure.

Good Control an Essential

Air conditioning involves simultaneous control of temperature and humidity, and without exact control this basic requirement of changing simultaneously the temperature and the moisture content of the air could not be met. A great deal of the control of conditions in an air conditioning installation is done by the mixture of airs. Conditioned air is mixed with an unconditioned air to produce a desired result and, simultaneously, more or less refrigeration or more or less cold water is circulated either through a coil or in a washer. Air entering the conditioner from outdoors is at the same time controlled by means of heaters or steam or hot water to create a new total heat which functions to set the moisture content of the air, and the condition in the enclosure itself is regulated by the heat or cold over a coil in the leaving air system.

Thus, a control system for a large installation is much like a jigsaw puzzle. The pieces are not strange but where they fit into each other and how each one is affected by the other is no simple problem.

I haven't as yet mentioned one thing which is of great importance, and that is air cleaning. The definition of air conditioning as developed by the American Society of Heating and Ventilating Engineers includes air cleanliness, and with the trend from air washers to coils (wet or dry) the problem of air cleaning becomes more and more important. Dust is probably more responsible for the spread of disease than any other one thing, but we must have cooling, and dust elimination takes, in too many cases, a secondary position in the requirements of an air conditioning system.

Water Requirements a Problem

With the great increase in the use of air conditioning with refrigeration, the requirements for water to condense the refrigerant (which vaporizes in the process of doing cooling) has become in many instances a serious drain on the water systems of cities and communities. Where the owner or contractor or manufacturer could get away with the use of city water, often brought from distances of hundreds of miles, for condensing purposes and then waste it to the sewers, that is the method that has been used.

The increase in the number of air conditioning systems has accelerated the development of both large and small evaporative condensers and cooling towers. Either of these is feasible for small jobs, the cooling tower of course being feasible for any size job. Both of these processes take only a very small percentage of the amount of water required for straight city water condensing.

The cooling tower, of course, is one of the oldest pieces of refrigeration equipment, its advent dating back to the first ice plants or breweries, but newer and better methods of water cooling with a better scientific and basic knowledge of the thermodynamics of the subject are bringing about better cooling towers for use with our decreasing water supplies.

I have not mentioned steam jet refrigeration, centrifugal water vapor refrigeration, the heat pump (the so-called reverse cycle) or absorption refrigeration. Although I am cognizant of all these developments, it is only because they still have not taken their place in the general air conditioning picture that I have not given them any prominence here.

Research a Dominant Factor

Probably the greatest thing that has been done in the last 50 years for air conditioning has been in the line of research. The American Society of Heating and Ventilating Engineers, in its intelligent research, has undoubtedly been a dominant factor in the spread of air conditioning. Since 1923—which is about the era of the turn of air conditioning from a minor art, except as it applied to the treatment of goods—the ASHVE has carried on without interruption research into the reaction of human beings to their environment, first in connection with high temperatures and high humidities in conjunction with the Bureau of Mines, and afterward independently in connection with comfort reactions and the development of effective temperature lines and comfort zones for both winter and summer.

ASHVE research has brought the medical profession into the air conditioning field. This is far from new. Knowledge of the effect of climate on human beings was originated by Hippocrates over 2000 years ago.

It is quite possible that the fever therapy research that was carried on by the laboratory of the ASHVE had much to do with the public acceptance of discussion relative to the cure of social diseases.

Fifty years is a short period both in the world's history and in the advancement of scientific methods. The atomic era is replete with air conditioning problems and out of this development may come such revolutionary changes that all of our old methods—or even our newest developments—may seem crude.

> *"As a crab moves on the ocean bottom, but is of the water, so Man rests his feet upon the earth but lives in the air. Man thinks of the crab as a water animal; illogically and curiously, he calls himself a creature of the land."—George Stewart, in his book "Storm."*

Today's Pipe Welding Practices

F. C. FANTZ, vice president, Midwest Piping & Supply Co., Inc., has played an important part in the growth of welding from its original status as a repair tool to its present position as a basic method of piping fabrication and installation. His discussion of pipe welding practices as used today includes numerous practical and valuable suggestions

To THE DESIGNER or engineer falls the delicate task of picking a particular type of welding that will meet his specific requirements. In this, he has a choice of several methods. Space limitations prevent a complete discussion of this matter here; we can, however, consider the newer types of welding and their application to piping systems.

One of the more modern methods which shows great promise in the development of the welding art is the submerged-arc type. This process is adaptable both to semi-automatic and fully automatic welding. The submerged-arc method is not new; very good welds have for some time been made in plate and other types of construction work, but it is only recently that the process has been adapted to pipe fabrication.

Submerged-arc welding produces an arc between the parent metal and a bare electrode of analogous composition. The arc is submerged in what is called a "melt", which is generally a granular limestone-and-silica-sand product, with the addition of certain other materials in small amounts. The melt is applied to the area of the weld in sufficient quantity so that the arc is entirely submerged in the pile, thus making it unnecessary for the operator to wear goggles. The high heat of the arc melts the welding rod and produces a fusion temperature in the parent metal. Simultaneously, a portion of the melt is fused, producing a heavy glass-like coating which adheres to the deposited metal and shields it from gases in the air during its first stage of cooling. As the weld progresses, the coat of fused melt cools faster than the weld metal and separates freely. The weld deposit is controlled by varying the amperage and voltage of the current, and the rate of travel. (Note that the work may be moved beneath the electrode, or the electrode over the work; but in either event, all welding must be done in a "down" position, so that the electrode is always above the part to be welded.)

As has been pointed out, the practical application of new industrial processes is sometimes more difficult to achieve than their theoretical development. This was also true when we attempted to apply the submerged-arc process to intricate and complicated piping assemblies. The additional equipment necessary to position the welding apparatus, and to revolve or move the work beneath the welding arc, involved laborious research, costing many times as much

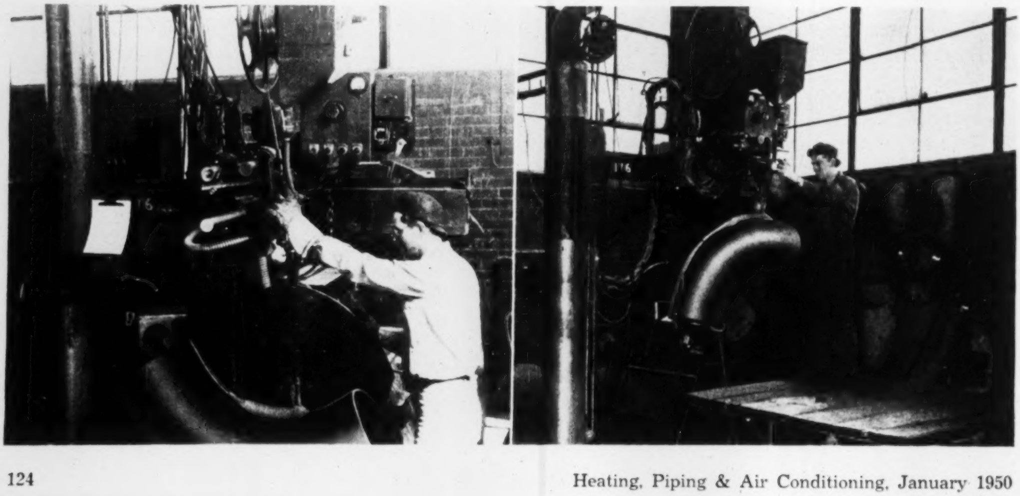


Fig. 20 ***(left)***—**Application of submerged-arc method to a 90 deg welding ell having tangents. Fig. 21** ***(right)***—**Submerged-arc welding of outside weld of 14 in. OD elbow with long tangents**

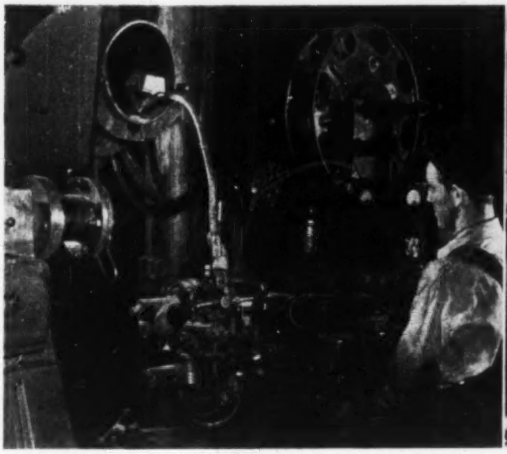


Fig. 22 ***(left)*****—Submerged-arc process for inside beading.**

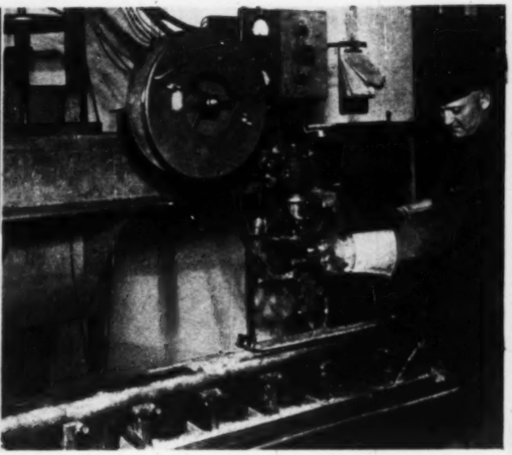


Fig. 23 ***(right)*****—Submerged-arc procedure for welding tees**

as the basic welding equipment.

In Fig. 20 is shown the application of the submerged-arc method to a 90 deg welding ell having tangents or straight sections on each end. Note that the machinery supporting the welding head may be likened to a radial drill press, since the radial arm can be raised to any desired position and can be swiveled through 360 deg. The welding head can be moved on the radial arm either manually, or by electric controls which are set for a specific rate of travel. Various types of work revolving machines can be positioned under this head, so that when the welding apparatus is stationary, the work can be revolved beneath the welding arc.

More than one work revolving machine may be positioned within range of the radial arm, to accommodate different sizes or classes of work.

The melt is carried in a hopper at the top of the welding apparatus and fed to the work through a flexible hose and suitable nozzle. The wire is fed from a spool through a smaller connection to the work.

Fig. 21 shows the application of submerged-arc welding to the outside weld of a 14 in. OD elbow with long tangents. Note that the fused portion of melt is separating from the weld approximately 16 in. behind the arc, leaving a very smooth and evenly-contoured weld deposit.

The welding of long tangent ells presented quite a problem: it was necessary for the welding head to travel horizontally along the radial arm in order to weld the tangent portion (for the elbow in Fig. 21, approximately 5 in. in length); then the head must stop and the machine supporting the ell rotate the fitting beneath the welding apparatus until the curved section has been completed; at this point, the motion of the ell must cease, and the head continue its movement until the other tangent section has been completed.

The entire procedure, including selection of materials, preparation of the groove, spacing, voltage and amperage, speed of travel, rotation of work and size of welding rod is all predetermined, and the resultant weld carefully checked by destructive and radiographic tests to determine its suitability for the work intended. The starting and stopping of the procedure are controlled by pushbutton, and once the machine is properly set, this pushbutton is the only control retained by the operator. He can in no way affect the quality of the weld.

The application of the process to inside beading is illustrated in Fig. 22. The welding head has been reversed to feed the wire upward through a curved conduit, which also supports a hopper for the melt. The shape of the conduit is such that the elbow can revolve freely over it.

Fig. 23 illustrates the submerged-arc procedure used for welding of tees. In this case, the welding head travels over a fixture which holds a number of fittings. After the process is completed, the welds are cut between each tee. Note the sliding shoe which is required to dam up the melt to the proper depth. While one "dolly" of fittings is being welded, another is being loaded and rolled into position on the track behind the operator.

After we had made some progress with the individual automatic welding machines designed for a particular job, it was decided that there were possibilities in applying this process to the general run of piping fabrication. This was not as easy as it first appeared to be: the welds in fabricated piping are of many types and do not appear in large quantities. The problem of setting up both work and welding machine became a major item.

The design was approached from the standpoint of devising a mechanical means of doing the same thing that a welder does—namely, pick up an electrode holder, carry it to a given position, guide it in the proper manner over the work to be welded, and then move on to another assembly. With this approach to the problem, we designed the machine shown in Fig. 24. It is essentially an overhead gantry type of bridge, carrying the welding head and the electrical and mechanical means for moving this head up, down and across the bridge in any direction. The crane itself is moved electrically up and down the shop on parallel tracks, flush with the floor. The traveling crane carries its own generator, and all electrical current is fed through three bus bars with sliding contacts

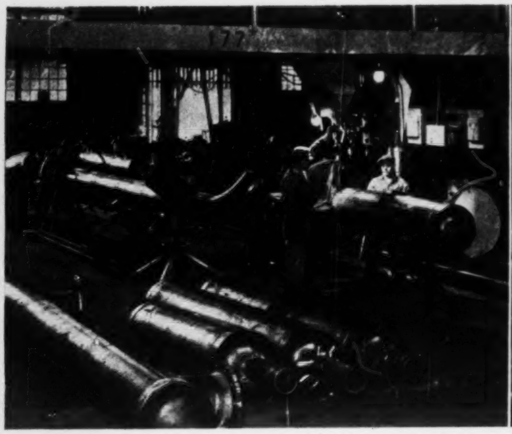


Fig. 24 *(left)*—**Automatic welding machine developed to apply the process to the general run of pipe fabrication.**

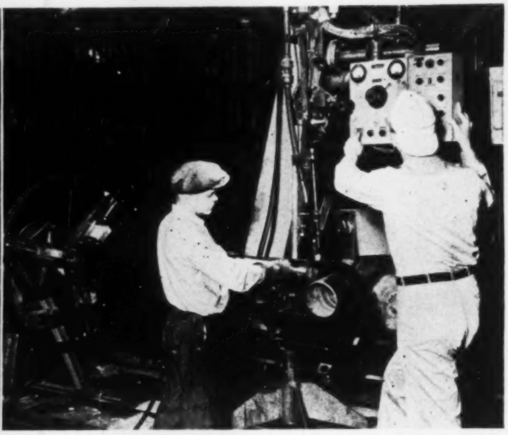


Fig. 25 *(right)*—**The welding head, showing controls for the gantry and the welding apparatus**

parallel to the floor track. All of the controls for movement of the crane and movement of the welding head, as well as the regulators for amperage, voltage, speed of rod, etc., are contained in a panel which moves with the welding head, so that it is accessible at all times to the welding operator.

Positioned in the area covered by the gantry crane are various types of work-rotating and moving equipment, each designed to handle a range of sizes and types of work. During the welding, the machine to be used is plugged into the panel adjacent to the welding head, so that all controls are centralized. In stating that the work-rotating machines are grounded, it might be emphasized that the ground connection in any welding apparatus (both manual and automatic, but particularly the latter) is as important as the lead to the welding electrode. Any variation in the carrying capacity of the ground connection will affect the results of the welding operation. On the apparatus shown in the photograph, large wiper shoes, spring loaded, are in contact with the track to produce a ground which will insure uniform carrying capacity.

In the operation of this submerged-arc welding machine, one crew operates the gantry and the work-rotating machine over which it is positioned; another crew is occupied in placing work in the other turning machine within range of the gantry, using for this purpose an overhead crane which travels above the welding apparatus. It takes less time to move the gantry and its equipment from one rotating machine to another than it does to describe it, and the contrast between manual and machine operation is made quite clear by this photograph.

Fig. 25 is a close-up of the welding head, showing the controls for the gantry and the welding apparatus: The instrument box on the left controls the head and the work-revolving machine; the one at the right controls the movement of the gantry and the vertical movement of the head.

A new machine (Fig. 26) has been developed for rotating pipe assemblies which are difficult to hold in a chuck or clamp. One "steady rest" is stationary; the other can be positioned to accommodate assemblies of varying length. The pipe rests on idler rollers and is turned by means of chains which grip the assembly. Means are provided to break these chains at various points to permit removal of the pipe and insertion of a new assembly. Air cylinders are used to take up slack in the chains and produce suitable tension on assemblies of varying diameters. The machine was designed with controls which permit a change in the rate of rotation during welding. A number of other novel features have been included to enable its use for experimental work in automatic welding.

The submerged-arc welding process is capable of welding relatively heavy thicknesses of plate at one pass, but our attempts to transfer this to circumferential welds in pipe prevented suitable application of the process for some time. Owing to the curvature of a circumferential butt weld, it is impractical to carry a large puddle of molten metal at one time—a restriction not encountered in the welding of flat plate, or tubular sections of large diameter. It was only when we decided to use several passes or beads on a given thickness of metal that we were able to make circumferential butt welds that would meet all of our requirements. These overlapping beads are continuous; once the welding is started, we do not stop the work, or break the arc, until the entire weld is completed. This is made possible by the fact that the removal of slag in the submerged-arc process does not present a problem. Such inclusions are practically nonexistent; hence, no difficulty is encountered in continuing the rotation of the piece to lay one bead over another.

The necessity of building up a weld in several passes proved to be a blessing in disguise. By laying a continuous bead, we avoided the difficulties often occasioned by breaking the arc and starting a new weld over a partially cooled deposit. In addition, we found that each succeeding pass applied over the previous one tended to stress relieve the completed portion of the weld, so that in the finished weld, we have coarse grain structure and locked-up stresses only in the last bead or overlay.

The disadvantage of the multiple-pass method lies in its cost, which is, of course, more than that of laying a single bead. But pressure and process piping demand the very best welding obtainable, and cost becomes a secondary item.

Preparation of Welding Grooves

The preparation of the groove for automatic welding is more important than it is in the case of hand welding. In the latter, the operator can compensate to a certain extent for discrepancies in preparation; in automatic welding, the operator has no control over the process once the welding is started. The type of groove and the spacing of the parent metal, whether the welding process is manual or automatic, will depend largely upon the procedure being used. Generally speaking, the parts should be separated by a distance equal to the shrinkage of the joint at right angles to the direction of the weld. If the spacing is wider than necessary, the operator must build up a bead on each side—in effect reducing the amount of spacing—and then continue the weld. If the spacing is too close, the operator will have difficulty in securing complete fusion and penetration to the inside of the pipe.

Regardless of the shape of the groove or the slope of its sides, the details of preparation will depend upon the skill of the operator and the size of the electrode being used. For economy and ease of welding, the width of the groove should be no greater than is required to produce complete fusion to the bottom of the weld and to permit easy removal of slag from each bead. The shape and preparation of the welding groove is a very definite part of the welding procedure, and tests made to qualify that procedure will prove whether the details are competently planned. The qualification tests of the operator will prove or disprove his ability to produce a sound weld by following the established procedure. It may be that the procedure will require a change, in order that the average welder can achieve good results.

The method by which the groove is formed is most important. Cutting should be done either by a machine guided oxyacetylene torch or by a machine tool, such as a lathe or pipe cutting machine. A hand manipulated cutting torch should not be used to prepare a welding surface, for, inevitably, the oxygen stream will produce irregular grooves containing slag deposits. Such deposits are very hard to work to the top of the puddle by any welding procedure. Where it becomes necessary to use a hand torch, the cutting should be followed by grinding or otherwise smoothing the welding surface.

In contrast, the bevel produced by a properly adjusted machine guided torch is very smooth, and the small amount of slag or oxide adhering to the work surface is readily removed before welding. But, in any event, no high or low spot should be allowed to remain on the beveled surface to trap slag.

A machine has been designed to move a cutting torch to generate the shape of a branch intersection (Fig. 27). This machine will produce intersections at angles from 45 to 90 deg to the header, and bevels the pipe while cutting the proper shape. The apparatus can also produce beveled or straight cuts for longitudinal butt welds.

Aluminum Welding

In discussing new welding procedures, attention might be given to the development of welding processes for aluminum piping. This metal, with its many chemical and structural advantages, will play an increasingly large part in piping. We are currently fabricating aluminum piping, including complex welded assemblies and welding fittings, for installation in a plant in Texas where operating conditions are minus 300 F. The material is 3S aluminum, and must withstand a Charpy impact test of 15 ft-lb minimum at the stated temperature.

Thin walled aluminum sections of 3/16 or ¼ in. thickness may be

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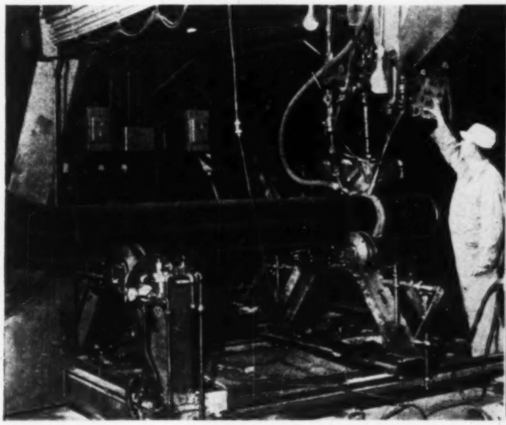


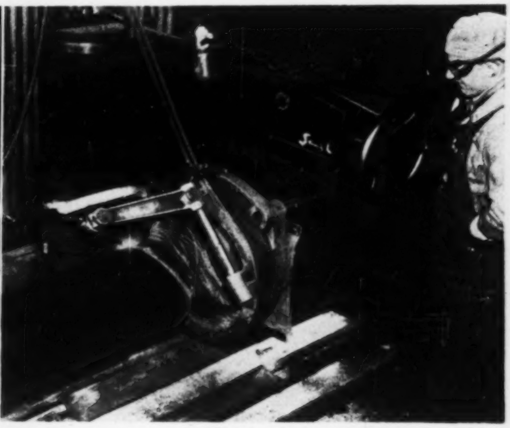


Fig. 26 *(left)*—Machine for rotating pipe assemblies which are difficult to hold in a chuck or clamp. Fig. 27 *(right)*—Machine to move a cutting torch to generate the shape of a branch intersection

Heating Practices—1900-1949

SAMUEL R. LEWIS, consulting mechanical engineer and member of HPAC's board of consulting and contributing editors, was asked to do a little reminiscing for this first 1950 issue of HPAC on heating practices since the first part of the 20th century. It is not his intent to give a complete discussion of the many developments which have been made in the heating of plants and big buildings, but rather to indicate by a few memories of "the old days" the great progress that has been made since then

MY ASSIGNMENT to review heating since the start of the 20th century implies that I commence by trying to expound all I knew in 1900—and then summarize all I have learned since then. Of course, I was blissfully ignorant at the beginning of the century and (of course) I am too modest even to hint at what I have learned since then.

In 1900—and for some years after—electric power was likely to be available only at night. Many good-sized towns still used gas for illumination. I had enough gas engine experience to become a troubleshooter laboring with gas and gasoline engines for operating ventilating fans in large public buildings. However, the preferable source of power for ventilating fans was the steam engine.

The vacuum and boiler feed pumps also were driven by steam. I remember a large high school, for example, in which there were several enormous eight-blade air supply fans, each driven by a direct connected, low pressure, steam engine having a cylinder 15 in. in diameter and a stroke 10 in. long. The air supply came from outdoors through windows at ground level. There was no attempt to filter the dust out of the air and no attempt was made to recirculate any part of the air.

Steam was generated in manually fired, brick set, horizontal return tubular boilers, the grate usually being not over 24 in. below the bottom of the boiler shell. The boiler pressure in this school was not over 40 psi. The engines and pumps operated on the difference between the boiler pressure and 5 psi in the heat transmitters, and whenever the quantity of the exhaust steam was insufficient, steam entered the low pressure system through an automatic pressure reducing valve.

If the steam pressure on the low pressure side increased, a back pressure valve wasted the steam to the atmosphere and prevented slowing down the engines.

Elaborate lubricating schemes for engine and pump cylinders were necessary, and oil separators with pumps to withdraw this oil against the frequent subatmospheric steam pressure were required.

The entering air was heated by steam, condensed in convectors made of 1 in. steel pipe screwed into horizontal cast iron bases. In some cases the exhaust steam from the engine which drove the main supply fan was never mixed with the low pressure steam sent through the reducing valve, but was condensed in a separate section of convector that was exposed first to the cold air on its way to the fan inlet. The inside of this special section soon was thoroughly coated with lubricating oil and as a result it was wise to waste the condensate to the sewer. Naturally, the boiler would acquire a considerable coating of scale from the solids brought into it by the constant stream of make-up water.

Every section of heat transmitting surface had a petcock type air valve in addition to an automatic air valve, since the latter was not always to be depended upon.

All condensate returns were graded to enter a receiving tank adjacent to and at an elevation considerably higher than the inlet to the boiler feed pump. This pump received steam through a balanced steam supply valve responding to a float inside the receiver. Condensate accumulating in the receiver lifted the float and, via a linkage, also opened the steam supply valve to the pump.

Air Venting Required Ingenuity

Adequate air venting of the old style convectors required some ingenuity. Each cored cast iron base had a little weep hole between the steam supply chamber and the condensate chamber intended to pass air from the steam side; and the air was expected to travel with the condensate back to the open vented receiver, from which the air could escape. The results from these early steam heating systems were acceptable, but their operation required an unusually intelligent chief engineer.

"Split" and "All-Indirect" Systems

In some cities the school heating system employed direct radiators along the outer walls in the classrooms and the air from the ventilating fans was sent at substantially constant temperature to all rooms, regardless of their orientation. This was called a split system.

In other cases, the school heating system used a separate air supply duct for each room, each such duct having at its inlet two interconnected dampers. This damper arrangement could be adjusted to select air from a supply chamber always higher in temperature than that desired in the room, or from a second air supply chamber always cooler than the temperature desired in the room.

This latter all-indirect arrangement without any radiators in the classrooms, was employed in many public schools and was adapted to give excellent service.

One difficulty with all steam heating systems that operate at atmospheric or higher pressure is to get rid of the air that originally occupied the interior cores of the heat transmitting surfaces. The air escape valves on the radiators were inclined to be leaky, noise-producing and short-lived.

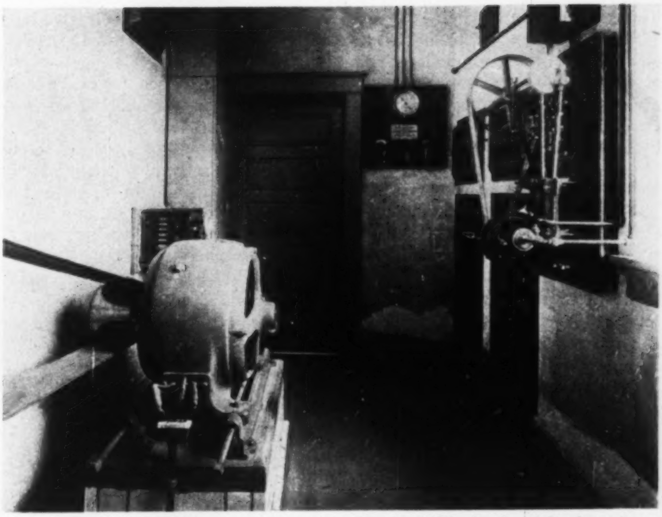
Subatmospheric steam heating systems were relatively rare in 1900. There was some public doubt about patents and possible infringements. Much of the designing for vacuum systems of steam heating was done by salesmen for special items of equipment, free of cost to owners and architects, in the hope that the ensuing sale and profit would justify the cost of the engineering. The various manufacturers were enjoying litigation with each other over alleged patent infringements. The purchaser of appliances having to do with subatmospheric pressure steam heating systems was bewildered as to whether his dollar went to pay a fine or a license for using some scheme, or for the appliance itself.

Getting Gases Out of the System

No one gave much consideration in 1900 to the corrosive effect of gases, and as a result there were frequent replacements of return pipes due to these outlaw gases, such as carbon dioxide.

An engineer named Paul was credited with the idea of connecting all of the air valves on steam heating transmitters with small pipes to a single, centrally located, exhauster which removed from the heating system the gases and such liquid as accompanied them. Originally this exhauster employed steam from the boiler, forced through a tapered orifice, ejector-fashion, wasting the steam. Another scheme comprised an airtight tank into which cold water was sprayed intermittently, condensing the steam that entered through the air piping to induce subatmospheric pressure. This arrangement worked for a little while, but the salts in the spray water, separated by the changes of state within the heated tank, quickly clogged the sprays and befouled the whole apparatus.

Recourse was made to city water to push to and fro a piston in a cylinder that thus pumped out the air from the air valve piping. But the scheme used too much water and soon was forgotten.



Belted motor driving a fan in a school building in 1908. At the right there is an air compressor for automatic temperature control, of the vertical reciprocating type with a single cylinder. The two furnace fronts at the right rear were manually fired with coal to heat two large brick ventilating chimneys to increase their ability to remove spent air from the classrooms

Eventually the small air pipes of the Paul system were supplanted by larger return pipes to convey both the gases and the condensate to the boiler room. Steam driven reciprocating exhausters called vacuum pumps became popular. Usually they had small steam cylinders and large air and water cylinders, the air being released from the hot water in an overhead receiving tank open to the atmosphere, and the condensate being returned to the boiler by a second steam driven boiler feed pump.

An automatic suction pressure governor controlled the vacuum pump and a float valve in the receiver governed the boiler feed pump.

Not all large heating systems had steam at high enough pressure to operate the pumps. It was evident that a low pressure heating system with vacuum pumps would be desirable and that if electric power were available this power might be used to operate the vacuum and boiler feed pumps.

In early cases the air-water end of the former reciprocating steam driven pump was geared to a shaft and pulley so that a belted electric motor could furnish the power for exhausting the gases and for returning the condensate to the boiler. This scheme was clumsy and noisy and soon led to the much simpler centrifugal, direct connected, electric driven combination vacuum and boiler feed pumps.

Boiler Ratings Not Standardized

In 1900 there was limited appreciation of the gains to be made by providing adequate clearances above the grates in a boiler so that the obviously necessary chemical processes of combustion could be at least partly completed before the gases were chilled by too close contact with the water cooled surfaces. As of today, except for oil or gas fuel, the combustion chamber heights have increased enormously.

The ratings of heating boilers were by no means standardized in 1900. I remember in the first decade of the century preparing and publishing a comparison between the advertised ratings of several of the leading boilers and demonstrating that these ratings were the result of competitive inflation and without a rational basis. Eventually, so chaotic were the ratings that the heating contractors' national organization was moved to furnish its own ratings of heating boilers. This move was followed soon by the manufacturers adopting the present dependable load values based on actual performance under test.

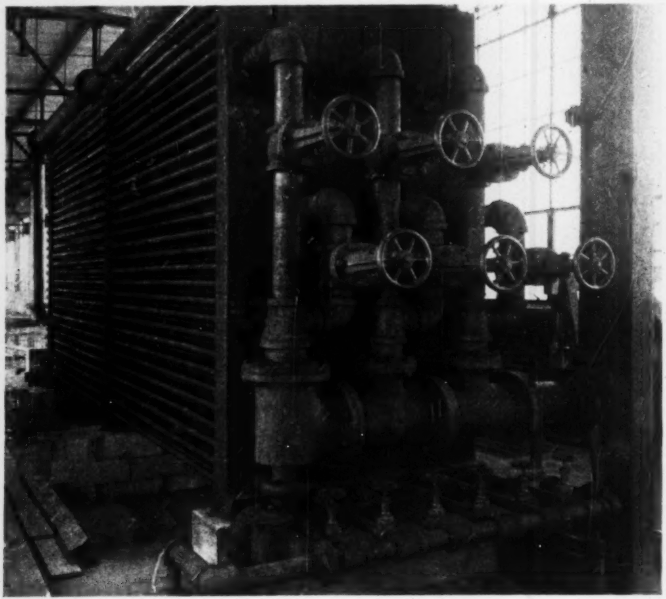
Centrifugal Fans in the Early Days

In the early years of the century, when an engineer selected a centrifugal (radial flow) fan from the manufacturer's catalog, he soon learned to discount the published rating by anywhere from 40 to 60 percent. The fan manufacturers' association eventually corrected these matters and developed a testing code which resulted in the present publication of necessary data for assured fan selection. In the early days, the centrifugal fans nearly all had eight blades, with wheels that were very wide in the dimension parallel with the fan shaft. The outlets from the housing scrolls were only about two-thirds the area of those on the present fans. If, perchance, one didn't secure enough air, additional blades sometimes were inserted intermediately between the original ones. If height clearance was restricted so that a standard wheel could not be installed, it was not unusual for the manufacturer to compute the expected air volume to be delivered per inch of original housing width, and then hopefully to increase the width of wheel and housing enough more inches at the same rate per inch to suggest that the desired capacity would be gained. The inlets for air around the shaft, however, couldn't be increased and these ill-proportioned, too-wide fans eventually disappeared.

A new type of fan was evolved that, regardless of wheel diameter, had 64 paddle wheel blades, narrow in dimension vertical to the shaft and with all other physical conditions of construction definitely proportioned. The narrow blades permitted larger diameter inlets for the same wheel diameter and the superiority of the design was demonstrated immediately.

While the original axial flow fans moved some air when placed in the side wall of a restaurant, for example, they failed when required to overcome any appreciable resistance such as heaters or long ducts always interpose. Only within a few recent years, probably due to World War II impetus, have there been developed axial flow fans that approach the capacity and efficiency of radial flow or scroll-housed centrifugal fans.

Construction view (about 1916) of a six-section steel pipe blast heating convector. This construction, using vertical cast iron headers with horizontal screwed-in pipes, was the forerunner of the 1949 steam heating coil with steam distributing tubes. In the heater illustrated the steam passed through horizontal pipes concentric with but inside the 1¼ in. outer pipes, the inner pipes reaching nearly to the return bends at the ends opposite the headers



Steam Heated Convectors for Fan Systems

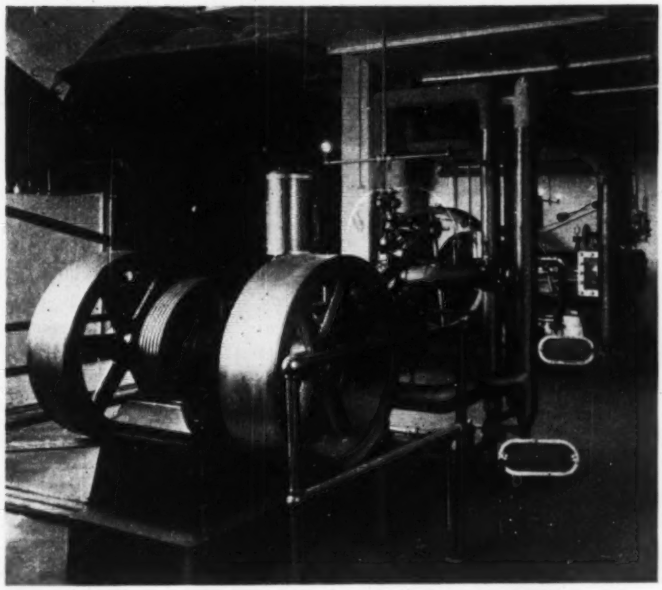
Steam heated convectors for fan systems of heating made of anything but ferrous pipes were unheard of at the beginning of the century. They were succeeded by cored cast iron slabs having diamond shaped hollow protuberances. These castings were assembled by screwing in right and left-threaded cast iron nipples. These heaters were a decided improvement over the pipe heaters, though they were heavy, and though the surfaces touched by the air tended to rust objectionably. It was not easy to freeze them and I am inclined to regret that they have become obsolete.

Eventually, the present, light weight, exceedingly efficient, thin-finned convectors appeared. They could be frozen with startling speed but the day was saved when interior steam distributing tubes were placed concentrically within the larger tubes that held the fins that "saw" the air.

Development of Hot Water Heating

We always had hot water heating systems with circulation of the water within the boiler, pipes and radiators induced only by weight difference due to heat. These gravity or thermal hot water systems were costly and sluggish and the piping required especially skillful design and workmanship. In the early days, electric power was scarce. Since we have attained, within the century, practically universal electric energy, the old gravity or thermal hot water heating systems largely have disappeared.

We now use much smaller pipes and radiators and apply a little electric pump to do the circulating, after the manner of the human heart. From this ability to circulate a liquid rapidly, regardless of its temperature, we have the present demand for radiant heating of all



Belted low pressure reciprocating steam engine driving a large air supply fan. A second engine is in the background. Note the lighted gas burners above the engines for illumination

sorts of buildings. We also employ electric heat directly, by resistance wires imbedded in masonry. Snow melting installations for sidewalks and driveways are also a result of this development.

I wish some better and more individual name would appear to replace the name, *unit heater*. I coined one years ago, but it never took hold. I suggested *Elicon* for an electric-fan-driven convector. There are many types of unit heaters. Some have axial flow fans and some have radial flow fans. Some have the steam or hot liquid heaters above the fans and some have them below or beside the fans. Some burn gas directly. Some have electric heaters.

Types of Stokers Used

Civilization seems to be marked by recurrence of cycles of mechanical appliances having to do with heating. For example, in most ancient China, perhaps antedating Charles Lamb's famous origin of roast pig, they enjoyed radiant heating of floors from chimney flues. The Pompeiian baths in Italy had smoke ducts through the masonry of the floors.

One of my earliest experiences had to do with a large, long ago removed, public service electric lighting plant that employed spreader stokers under the boilers. They were considered obsolete, yet today spreaders have returned. Underfeed stokers for large heating boilers were popular early in the century, then seemed to retire in favor of progressive horizontal stoking as with traveling or reciprocating grates. After a few years the underfeed worm type of stoker revived, and now we find electric driven underfeed stokers exceedingly popular.

Prior to the era of universal electric power, the double grate downdraft-through-new-fuel type of combustion chamber was efficient and could be operated with little smoke.

Apparently at present the pressure for mechanical stokers has obscured some of the downdraft furnace glamour.

In very large high pressure boiler plants, after living through many of the combustion schemes herein suggested, there emerges the recent successful fusing or melting of the ash and other unburnable debris from coal so that it emerges from the furnace as liquid slag and can be piped away before solidifying.

PIPE WELDING—

[*Concluded from page 127*]

welded without beveling, provided the material is spaced properly. Preferably, the weld should be backed up with a strip of aluminum (copper or stainless steel strips may also be used, but require removal upon completion of the weld).

At the present time, we are welding aluminum with an a-c tungsten arc, shielded with argon gas. The amounts of tungsten and argon vary with the wall thickness. The aluminum filler metal is 3/16 to ¼ in. rod. This type of welding may be used in all positions, and preliminary tests indicate that the procedure can be adapted to welding without backing rings.

Welders for this type of work should be selected with care. We find that combination or acetylene welders are generally superior, due to their training in the use of both hands. This ambidextrous ability is quite important, since any contact between the tungsten electrode and the aluminum filler rod will cause large amounts of tungsten to disintegrate and become imbedded in the molten pool. Such a condition will cause poor welds, and will be revealed by x ray examination. This same characteristic requires the use of extreme care in starting the arc, which should be done on a small piece of aluminum or copper lying close to the starting point of welding.

In welding aluminum pipe in sizes 12 in. and larger, automatic welding equipment may be used for both circumferential and longitudinal welds. This type of equipment also operates on the tungsten arc shielded with argon gas.

Based on current experience, the welding time for aluminum is about the same as for carbon-moly piping, or approximately two to three times that of carbon steel. This holds true for both automatic and hand welding. Where no cutting or shaping is involved, the setting up time is approximately 50 percent greater than that for steel.

[This is the third of three articles on this subject by Mr. Fantz, the first two of which were published in the November and December issues of HPAC. These articles are based on a talk given by Mr. Fantz before the 1949 annual refinery engineers meeting of the Shell Oil Co.]

Minus 85 F Refrigeration for Film Processing at Kodak Park

JAMES H. SHAW, refrigeration engineer, Eastman Kodak Co., describes the auxiliary equipment for the big ultra-low brine temperature system recently installed and currently being expanded for film processing at Kodak Park. He also discusses preparation of the system for operation, the minor—and one major—difficulties that arose, and how they have been corrected. A far cry from the 300 to 400 lb of ice used daily back in the 1880's (when Eastman Kodak was struggling to make a start in the photographic field) for setting emulsions, the system has a capacity of 750 tons refrigeration at −85, is being doubled

BECAUSE METHYLENE chloride evaporates so readily, with a boiling point of 103.6 F at atmospheric pressure, a closed piping system was necessary for the new −85 F refrigeration system at the Kodak Park plant of the Eastman Kodak Co., Rochester, N. Y., which uses methylene chloride brine. Also, methylene chloride has a very large coefficient of cubical expansion, approximately 6.5 times that of water. Therefore, a sizeable surge or balance tank became a necessary piece of equipment.

The balance tank is vertical, 12 ft in diameter and 14 ft high overall, and has a full capacity of about 11,000 gal. The tank is connected by a single 6 in. line to the brine return main, which is the pump suction header, and floats on the system.

The 6 in. line enters the balance tank in the lower half, turns downward and ends about 6 in. from the bottom head. This scheme was used so that the tank would remain cooled down by convection through the 6 in. connecting line and at the same time liquid seal the tank with the system.

The level in the tank is kept below half full, leaving ample space to accommodate brine that may be pumped out of one of the solvent condensers back into the system. Also, the large air space allows a very constant pressure on the system with variations in the system temperature. This space above the brine in the balance tank is filled with dry air with a −60 F or lower dew point and 25 psi pressure. This air pressure is maintained at all times and is high enough to keep a small positive pressure at the highest point in the system and insure a positive suction pressure at the brine pumps. A level recorder with a low level alarm gives a daily record of the tank level and is a valuable operating aid. A few degrees change in the return brine temperature will show on the level recorder as the system volume changes. With steady temperatures the recorder will indicate a loss from the system which would demand immediate remedy.

Drying Air Used for Balance Tank

Although water has a solubility of only 0.008 percent by volume in methylene chloride at −80 F, when present in excess, it has a detrimental effect on the refrigeration equipment. Since an inert gas such as nitrogen was not available with sufficient dryness for use on the balance tank, we decided to use plant compressed air and wring all possible moisture out of it.

The air drying equipment is designed for a capacity of 50 cfm of free air. This seemingly large capacity is partly used for all of the control instruments in the refrigeration plant. This supply of clean, dry air to the instruments has made for better operation and decreased maintenance on them.

The plant air is received at 80 psig with a dew point of about 70 F and passes through a 35 F chilled water cooler where the air temperature is reduced to 60 F and water is trapped out. The air then passes through an oil removal filter and then to a double tower silica gel air dryer. The dryer removes moisture to −47 F or colder dew point. Out of the dryer, the air is next reduced in pressure from 80 to 25 psig and the dew point then is −60 F or colder. The 25 psig air then is piped to the balance tank and plant control instruments.

An emergency air compressor unit is connected into this system and comes on the line when the plant air pressure drops to 70 psig. A check valve prevents the compressor from supplying the whole plant air system.

At the air pressure reducing station adjacent to the air dryer, pressure gages with alarm contacts are installed. The upstream gage sounds the plant emergency horn in case the high pressure air drops to 60 lb and the downstream gage does likewise if the reduced air pressure drops to 20 lb.

The air dryer towers are alternated every 12 hr. The off tower is then regenerated with a built-in electric heater and fan. The completion of the regenerating cycle is indicated by an abrupt increase in the air temperature leaving the tower being dried out. Automatic controls cut off the heater and fan and the tower is then ready for its next 12 hr work cycle.

Because of the complexity of the brine system and because it is a closed system, an auxiliary piping system is provided for transferring brine to or from and venting each tank, cooler, pump, pipe section, railroad tank car, and solvent condenser. The brine pumps drain into a common tank in the basement, but all other equipment containing methylene chloride is connected into a common 2 in. liquid line and a 1 in. vent line.

Auxiliary Piping System for Brine

The liquid line runs to a valve manifold and a 50 gpm, 60 ft head centrifugal pump located on the operating floor. By means of this system, any of the equipment can be filled or pumped out, with the vent system allowing free transfer and no atmospheric venting. The one exception is when a railroad tank car is being unloaded into the brine storage tank located on a low roof of the refrigeration plant.

The vent line is always kept open between the balance and storage tanks and therefore is always under 25 lb pressure, which is the dry air pressure on the balance tank. The vent is normally closed to all other items of equipment. This 25 lb pressure allows easy pumpout of the brine coolers, located in the basement, assuring positive pressure on the suction of the brine transfer pump on the operating floor. This same feature applies to the main brine pump drain out tank in the basement.

The refrigeration plant can pump warm brine to the solvent condensers in either film production building. If a condenser is to be emptied, its cold brine is pumped back into its adjacent return line of the distribution system with a portable pump. The brine is displaced by dry air from a portable silica gel dryer.

If a refrigerating cooler is to be opened up or the brine warmed up for other reasons, the brine is recirculated through 2 in. lines with an electric heater element in the line, using the brine transfer pump. As the brine warms up and expands, the surplus brine is either bled off manually or relieved through a relief valve to the storage tank.

Cooling down a cooler after it has been filled with warm brine is accomplished by slowly displacing the warm brine with cold brine from the system through a 2 in. bypass line around the cooler shutoff valves. The warming or cooling operation requires about 12 hr. This time has been set arbitrarily to eliminate unnecessary temperature stresses in the cooler shell.

Relief Valves and Rupture Discs

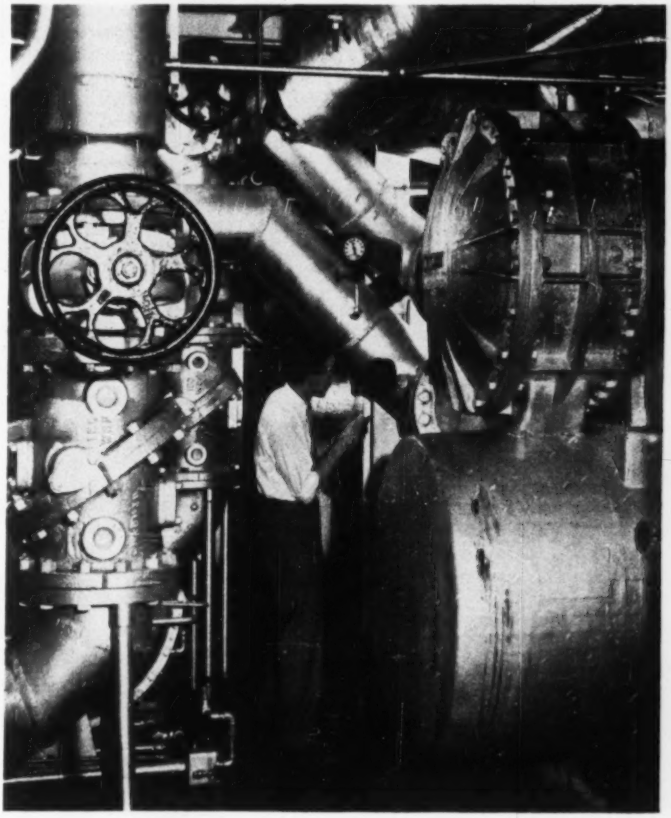
Relief valves are located at strategic points in the system to prevent rupture when isolated due to expansion of the liquid methylene chloride. The discharges from most of the relief valves are piped to the brine storage tank located on a low roof of the refrigeration building. Relief valves on the storage tank and balance tank are installed with rupture discs ahead of them and discharge to atmosphere. The rupture discs are used to prevent leakage of methylene chloride in case of relief valve leakage.

All relief valves are set to open at 80 psig and the two rupture discs are designed to break at 100 psig. The rupture disc material is silver, which is recommended for low temperature service with noncorrosive liquids. Stainless steel discs are used on tanks where above atmospheric temperature methylene chloride is stored, as this material resists corrosion by breakdown products given up by the methylene chloride after a long period of time.

Preparing System for Operation

The installed piping system, exclusive of the film department solvent condensers, has a capacity of 55,000 gal. The ultimate system, with all planned solvent condensers converted from —36 F to —85 F operation, will total an estimated 195,000 gal of methylene chloride. However, the initial cleaning and dehydrating process of the piping

Operation of some of the low temperature refrigeration equipment being checked by the author



and distribution mains required the handling of a 55,000 gal volume.

To remove mill scale, oil and unavoidable dirt, all of the piping and brine coolers were flushed with water, acid cleaned, water flushed again, and finally alcohol flushed.

The distribution mains were prepared in two operations. The mains to one production building were completed first and put in operation before the lines to the second production building were completed. However, both cleaning processes were identical. The first section cleaned has a volume of 32,000 gal.

The method of best cleaning the equipment was worked out with our metallurgical laboratory and the acid cleaning portion was turned over to an outside company specializing in such work.

The acid used was hydrochloric in a 6 percent solution together with an inhibitor. Our laboratory found that hydrochloric acid would do a good job of cleaning, but very slightly reduced the ductility of the nickel steel, creating mild acid embrittlement. This showed up as a nearly negligible amount in bending tests and low temperature impact tests. Some embrittlement was found in a soft iron wire sample after treatment in the 6 percent acid test solution. The embrittlement in the wire was removed by a 3 hr hot water wash at 180 F. Based on these tests, a hot water flush was incorporated as part of the cleaning.

The whole procedure of acid cleaning up to the final alcohol flush consumed about 26 continuous hours. So as not to overheat the two brine coolers beyond 110 F, set by the manufacturers as the safe limit, the cooler valves were kept closed until the last end of the process when the acid or water flush had cooled to 110 F. The pipe lines and brine pumps were filled with warm water and recirculated for several hours through 260 lb steam injectors until the water was heated to 160 F. This was done to preheat the piping so the acid solution would remain hot as long as possible. The lines were then drained and a 6 to 7 percent inhibited hydrochloric acid solution pumped in at 170 F. The acid solution was circulated for 4 hr until the acid tested about 2 percent and held at this concentration, indicating the reaction was completed. Before dumping the cooled acid, the coolers were treated at about 110 F.

Draining the acid, refilling with hot water and circulating at 180 F for 4 hr required about 10 hr time. During this hot water flush, the line pressure was raised to 130 lb to hydrostatically test the lines. No leaks were found.

Since we did not want to expose the lines to atmospheric air after the alcohol flush, which was to be followed immediately by filling with methylene chloride, all orifice plates and thermometer wells were installed as soon as the hot water was drained.

The alcohol solution used was 20 percent methyl alcohol—methylene chloride mixture. This mixture was used to reduce materially the hazard of using 100 percent alcohol. The 20 percent alcohol was calculated to be ample to absorb the estimated remaining moisture. The solution was circulated 4 hr, pumped out, with dry air replacing the solution, and the system refilled with methylene chloride.

With the lines standing full of methylene chloride brine, and before the lines were refrigerated, the remaining uncovered sections of piping at the welds were cork covered. All welds had been left bare to permit inspection under the final hydrostatic test.

"With Our Fingers Crossed"

With everything in readiness, the pipe lines standing full of brine, the turbines having been tested for overspeed setting, final hot alignment checks completed, "Freon" piping and joints pressure and vacuum tested—and most of us with our fingers crossed—the system was put into operation on the morning of July 15, 1948.

The initial load was very light. With only one production department solvent condenser on the line with 25 tons, line losses, and probably inaccurate instruments at such low ratings, the total initial load calculated about 70 tons. In order to increase the total brine flow to a reasonable amount, from the solvent condenser required flow of 150 gpm, a 6 in. bypass was opened at the far end of the mains. This brought the flow up to 1800 gpm and the range was about 2⅓ F. Under these load conditions the 375 ton machine, with wide open gas bypasses and reduced turbine speeds, operated fairly well to give a steady −85 F brine temperature.

On the initial startup, the brine was pulled down to −100 F for 15 min. The time to cool down from about 70 F to −100 F was about 6 hr. With operating experience, the startup time has been cut to ½ hr since normally the down machine is kept cool at about −60 F by bypassing a small amount of brine through the cooler, and the turbines are kept warm through open exhaust valves.

The section of distribution mains first put into service included 320 ft of 18 in. pipe, 2000 ft of 16 in. pipe, and 400 ft of 12 in. pipe. The line loss due to temperature rise based on an ultimate flow of 2400 gpm and 155 F temperature difference between air (cork surface) and brine at an average temperature of −80 F was calculated to be 0.272 F due to conduction through the 6 in. thick cork and 0.07 F due to pumping, or 0.342 F total. Radiation absorption losses were not calculated. This total calculated loss was checked by a 0.5 F rise with 1500 gpm flowing at the time, between calibrated thermometers in the refrigeration plant and production building.

About six weeks time was consumed eliminating the initial operating defects and overcoming minor difficulty. A serious difficulty (to be described later) showed itself about seven months after initial startup. With the very low loads, one machine was available for adjustment.

Correcting Minor Difficulties

Numerous minor faults in the refrigeration equipment and brine pumps were corrected satisfactorily. The cooler floats gave some difficulty at first by not allowing sufficient "Freon" to pass. This was corrected by drilling bypass holes in the float housings. The high stage compressor covers were lifted on each machine to make a correction. The purger air discharge valves started leaking, and the trouble was corrected by installing spring loaded valves. Brine valve stuffing boxes leaked and destroyed some cork covering. Sheet metal shields drawn tightly against the valve body just under the stuffing box gland with string asbestos packing between eliminated further trouble here.

In connection with brine leakage, it was originally planned to put a red dye into the brine as an aid in detecting leaks. The dye to be used is Azo oil red but has not yet been used because of lack of permission from the film department. Possible contamination of the product is feared in case of solvent condenser leakage. Because of the rapidly growing system, no accurate record is possible yet of the system leakage and make-up, but the loss is believed to be exceedingly small.

All four brine pumps gave considerable trouble for a time with the breaking of the carbon ring shaft seals. It was discovered that the liquid sealing line which circulates cold methylene chloride through the shaft seal from the pump discharge nozzle to the pump suction nozzle was gas binding, causing sluggish or no flow through the sealing chamber. This caused the carbon rings to overheat, seize and break with a resultant gusher of brine discharged out along the shaft. This difficulty, after some experimenting, was eliminated by installing an atmospheric vent with a gate valve to bleed the sealing line of gas until circulation had been assured. This procedure is now standard practice.

For about seven months the equipment operated very well, with the load gradually increasing as each solvent condenser was added to the system. Then, late in February 1949, it was noticed that the brine cooler suction temperature was far too low for the then 160 ton load. Instead of a normal —90 F, the temperature at times was recorded at —110 F, with both turbines at full speed and the brine somewhat warmer than —85 F. Lack of heat transfer was suspected, caused by the dewaxing of the compressor oil on the tube surfaces or some deposit on the brine side of the tubes or both.

Our chemical laboratory made numerous tests of oil samples from the compressors, new oil, and oil removed from the cooler. Each sample was added to "Freon 11" to give a 2 percent oil-"Freon" solution and cooled to —90 F with dry ice and acetone. A sample of 100 percent "Freon 11" also was cooled to —90 F to be used as a comparator. "Freon 11" was used rather than "Freon 12" because it is easier to handle and affects oil about the same as does "Freon 12."

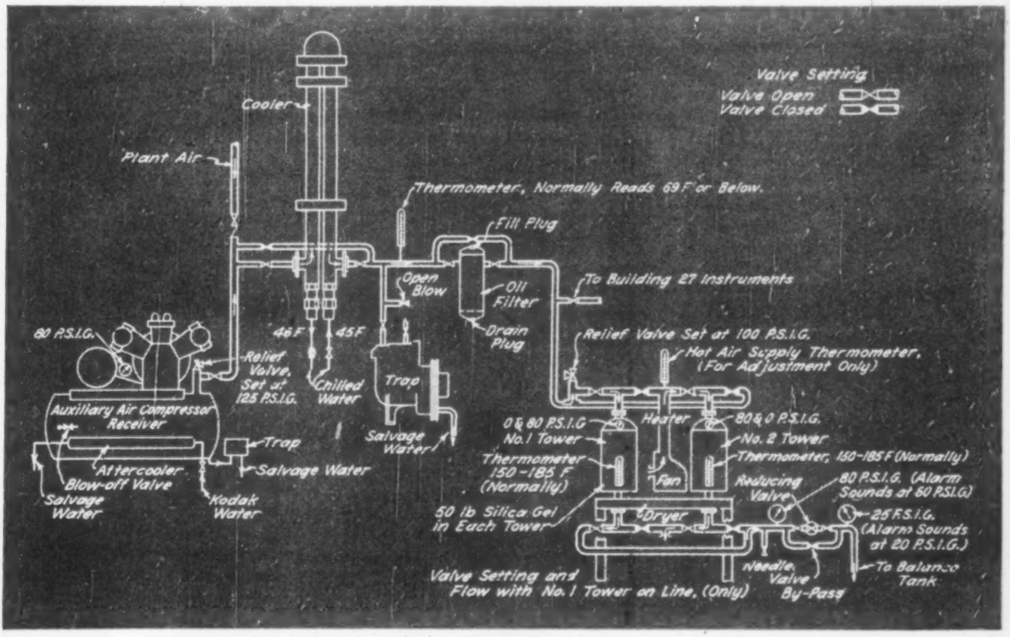
The results of these tests showed that the new compressor oil became very cloudy, with moisture and wax crystals in suspension. These crystals gradually rose to the top of the solution to form a white fluff. Oil out of the compressors became cloudy; less dense than new oil but much more dense than the cooler oil. Oil from the cooler showed a slight haze at —90 F with very tiny crystals discernible with proper lighting. The surprising sample was the "Freon 11," which also showed a very slight haze at —90 F, indicating moisture had been frozen out of solution. The oil samples were filtered cold, and a definitely waxy residue remained on the filter paper. The wax readily dissolved in "Freon 11."

Trouble Decided To Be in Brine System

The oil tests did not appear to be conclusive and later the trouble was proved to be caused not by the compressor oil in the cooler, and further work on the oils was abandoned.

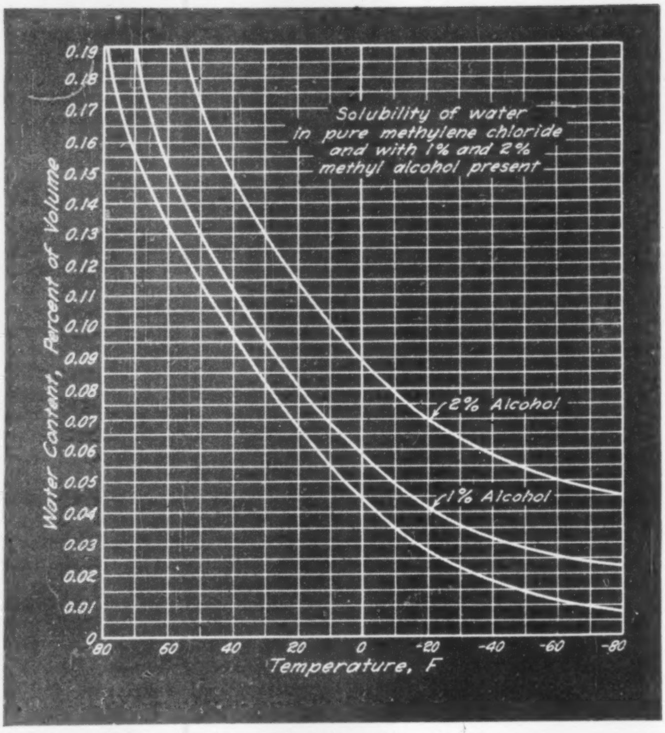
The refrigeration equipment people were called in and—after a few sparring punches at the problem—

Air drying equipment supplies nearly moisture-free air to hold methylene chloride brine system under positive pressure. This is a simplified diagram of the air drying operation. The chilled water temperatures in and out of the cooler have been changed to 35 F and 37 F since this diagram was prepared


Valve Setting
Valve Open
Valve Closed
Cooler
Plant Air
Thermometer, Normally Reads 69 F or Below.
Fill Plug
Open Blow
Oil Filter
To Building 27 Instruments
Drain Plug
80 P.S.I.G.
46 F
45 F
Relief Valve, Set at 125 P.S.I.G.
Chilled Water
Trap
Relief Valve Set at 100 P.S.I.G.
Hot Air Supply Thermometer, (For Adjustment Only)
Auxiliary Air Compressor Receiver
Trap
Salvage Water
0 & 80 P.S.I.G
No. 1 Tower
Heater
80 & 0 P.S.I.G.
No. 2 Tower
Thermometer, 150-185 F (Normally)
Aftercooler
Blow-off Valve
Salvage Water
Salvage Water
Kodak Water
Thermometer 150-185 F (Normally)
Fan
Reducing Valve
80 P.S.I.G. (Alarm Sounds at 60 P.S.I.G.)
50 lb Silica Gel in Each Tower
Dryer
25 P.S.I.G. (Alarm Sounds at 20 P.S.I.G.)
Needle Valve
By-Pass
To Balance Tank
Valve Setting and Flow with No. 1 Tower on Line, (Only)

an operating data curve was plotted from the operating logs for several prior weeks. The curve showed load, entering and leaving brine temperatures, and the "Freon 12" temperature in the cooler. From these the heat transfer coefficient was calculated and plotted. On February 14, 1949 an abrupt change was noted. The curves were then replotted for each hour of that day, starting at midnight. At 9:15 a.m. the curves showed that the heat transfer began to drop, with perfectly normal operation up to that time. All concerned were satisfied the trouble was in the brine and not in the refrigerating equipment or "Freon" cycle. The problem then reverted entirely back to us as an operating problem.

It was learned that at precisely the time our trouble started, the ninth solvent condenser was put on the line. These solvent condensers, when shut down for conversion from —36 F calcium chloride brine to —85 F service, are acid cleaned and alcohol flushed in a manner similar to the method used on the nickel steel pipe lines. Inevitably, even with the utmost precaution, there always must be minute quantities of moisture that remain and ultimately get into the —85 F brine system.



Solubility of water in pure methylene chloride, and with 1 and 2 percent methyl alcohol present

The solubility of water in methylene chloride at —85 F is 0.007 percent by volume and is 0.158 percent at 70 F. The methylene chloride as received in tank car lots contains an average of 0.04 percent moisture by volume, which corresponds to the saturation temperature at about —5 F. Thus, it can be seen that when the brine is cooled from 70 F to —85 F, excess moisture is frozen out of solution. This is illustrated in the accompanying saturation curves.

Water in the system, which by February 14 contained 80,000 gal of methylene chloride, was calculated to be about 16 gal. However, due to the fact the nickel steel pipe lines and solvent condensers were alcohol flushed, enough alcohol remained in the system after draining to keep some of the excess water in solution. The chemical laboratory analyzed a sample from the system and found 0.02 percent water and 0.77 percent alcohol. This sample was cooled to —90 F, filtered, and again checked. The filtered sample then contained 0.01 percent water and 0.48 percent alcohol. This proved that the water-alcohol solution was freezing out on the cooler tubes.

When the ninth solvent condenser went on the line, sufficient moisture was added to the system to start the freezing out process. This occurrence started on the morning of February 14, as we found on the plotted operating data. Since that date, several additional solvent condensers and raw methylene chloride have been added to the system until now about 100,000 gal is in circulation.

Our chemists originally believed that the small amount of excess water in the presence of alcohol would separate out of the methylene chloride in a separate liquid phase, float on top of the brine and could be vented out of the system from the various high points. We were never able to accomplish this even with an inverted "drip" pipe on the top of the main return header. In addition to the fouling of the cooler tubes, excess moisture will form a weak acid in the brine and this would not be very desirable. Therefore, the moisture had to be removed and kept out of the system.

Activated carbon will absorb impurities at the ratio of about 1000 lb of carbon to 50 lb of impurities. Silica gel will absorb about 30 percent of its weight of water and alcohol and theoretically should reduce the moisture content of the brine to 0.01 percent or less.

Filters for Brine Installed

Three filters were designed and installed to operate in series. They were piped to the brine transfer piping system and transfer pump. The first filter in the series contained activated carbon to remove color found to be dissolved organic material and foreign materials, such as iron oxide, etc., thought to be in the brine. The second filter contains silica gel to remove water but which also removes alcohol. The third is a felt bag filter to catch any fine particles of the carbon or gel. The carbon and gel filters are each 24 in. OD pipe and contain 6 ft beds of the filtering medium.

Our initial attempt to filter the brine system on a bypass system proved to be an exceedingly slow process. After a few weeks, a very small reduction in moisture content could be detected in the brine system. Our present method of batch filtering is proving successful.

When a refrigerating machine shows definite signs of loss of heat transfer in the cooler, it is shut down, the brine cooler isolated from the system, the brine warmed up by recirculation through the electric heater, and then when the brine reaches about 70 F it is recirculated through the filters.

During the two or three weeks of bypass filtering of the brine system, the activated carbon completely removed all color from the system and the carbon filtering has been discontinued. The carbon filter shell is now being used as a second silica gel filter alternating in parallel with the first one. When the system moisture content is reduced to 0.007 percent or less, it is planned to add up to 5 percent alcohol to prevent future freezing out of the water. Up to about 5 percent alcohol-methylene chloride solution, the hazard due to the alcohol is slight.

After a cooler is warmed up and just prior to filtering its brine, a vent valve on the water box is opened to drain out the free water. When this venting was done the first time, nearly $1\frac{1}{2}$ gal of free water was drained out; lesser amounts have been drained since then. The methylene chloride in the cooler at the 70 F temperature is always found completely saturated with up to 0.18 percent moisture and up to 0.75 percent alcohol. After filtering for about 48 hr, this is reduced to about 0.03 percent water and about 0.5 percent alcohol. The cooler is then cooled and the machine made ready to go on the line.

The load is anticipated to reach 1100 tons by the end of 1950 with a large number of solvent condensers to be added. For this reason the filters are to be kept in service until probably mid-1951.

Advantages of System Are Proved

The moisture problem is the only known difficulty left and the solution of the problem is known and is being worked out.

The savings with this new system over the old —36 F calcium chloride brine system exceed the anticipated return by showing greater solvent recovery than calculated. Other valuable items in favor of the —85 F system are greater safety in the production department, nearly complete elimination of toxic gases in the film machine areas, and greater film machine speeds.

[This is the third of three articles by Mr. Shaw on this installation. The first two appeared in the November and December issues.]

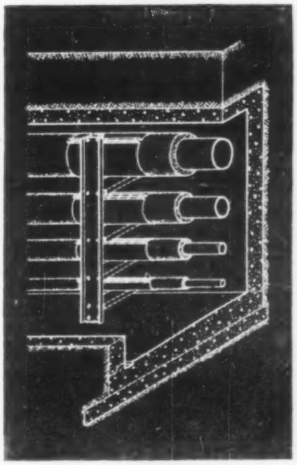
INSULATING PIPE SUPPORTS TO REDUCE THE HEAT LOSS

To PREVENT excessive heat losses due to direct metal-to-metal contact between hot pipe surfaces and structural supports, so-called insulated supports may be used. In this type of installation, developed by Sargent & Lundy, engineers, from test work done at the University of Illinois, the entire length of piping is insulated in the usual manner and then supported by hangers or by channel irons.

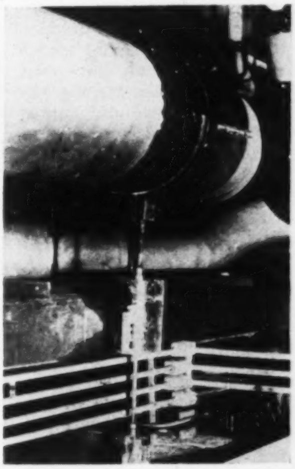
Where the piping is to be supported by a hanger, a 10 ga steel plate, its length proportioned to the load to be carried, is rolled into a band to fit the insulated pipe and provided with a flange for assembly. A saddle plate, $\frac{3}{8}$ in. thick, is then tack welded around the lower half of the flanged band to assist in carrying the direct load and in spreading it over a wide area. The unit is then bolted in place around the insulated pipe, a filler bar is fitted over the upper half of the flanged band, and the usual hanger strap is fastened around the entire assembly.

Where the pipe line is to be supported by channel irons, a 16 ga sheet metal band, 18 in. long and flanged for assembly, is bolted around the insulated pipe at each point of support.

Since the pipe rests on the insulation at the supports, the insulating material used must be able to bear the weight of the pipe. On the basis of the tests conducted at the University of Illinois, a loading capacity of 10 lb per sq in., or 100 lb per running inch of line, has been established for 85 percent magnesia.



Piping, insulation, bands, and channel supports as installed in underground conduit at University of Illinois



Specially designed pipe hanger on main steam line at a utility central station. Weight of the pipe rests on the magnesia insulation

Outdoor Air Is the Heat Source For Office Building's Heat Pump

Three 75 hp reciprocating compressors are used both to heat and cool this modern office building in Roanoke, Va.

THE APPALACHIAN Electric Power Co.'s new, modern, six story office building in Roanoke, Va., is air conditioned the year 'round by a heat pump system. This heat pump possesses a number of interesting and unusual features which improve its competitive position in the comfort heating and cooling fields.

Air is used exclusively as the heat source during the heating cycle and for the removal of the heat rejected from the building during the cooling cycle. Storage tanks charged with warm or cold water, depending on the season, permit practical compressor selection having flexible and efficient operation. Unit room air conditioners, 153 of them located throughout the building, supplemented by a duct system for ventilation air, allow individual room control.

The liquid refrigerant is subcooled by preheating the ventilation air, thereby increasing the system's efficiency during the heating cycle. The exhaust air leaving the building is used as a heat source for a separate heat pump which heats the domestic water supply for the entire building.

Another feature, made a part of the system, is the provision for the melting of snow and the prevention of ice on the concrete ramp from the street to the garage located below grade.

Volume of Building 1.15 Million Cu Ft

The building provides 87,600 sq ft of floor area and encloses a volume of 1.15 million cu ft (excluding the garage). The garage has 9150 sq ft floor area and 92,000 cu ft volume. The office portion of the structure is designed for three additional floors so that the ultimate height will be nine stories.

A partial basement below grade houses the automatic telephone equipment, the electric equipment, and the two 5000 gal water storage tanks which are part of the heat pump system. The basement was made as small as possible, since the entire building is founded on rock and it was desirable to keep excavation to a minimum.

The garage in the rear of the building is sufficiently below grade so that the roof is at street level. It serves as a parking place for employees' cars.

The heat pump equipment and the elevator machinery are in the pent house structure. All equipment has been located so that the addition of the future three stories will necessitate minimum structural changes.

The entire structure is of monolithic reinforced concrete fireproof construction. The street exteriors up to the second floor level are faced with polished granite. Above this level the exterior walls consist of a pink iron-spot face brick with spandrels of contrasting red and dark pink brick laid in a pattern. The parapet walls are capped with Indiana limestone.

The exterior walls in general are 12 in. thick. The ceilings and interior walls are plastered and the exterior walls are furred and plastered. In general, the floor framing for the office portion of the building is of the steel pan, concrete joist design. The sixth floor roof consists of tar and gravel on top of 2 in. of rigid insulation. All windows above the first floor are single glazed with storm sash. The windows at street level are double glazed.

Basis of Heating, Cooling Design

Climatological data giving the minimum and maximum temperatures published by the U. S. Weather Bureau were studied to determine the design temperature for the selection of the heating and cooling equipment. Based on this study, 15 F dry bulb outdoor temperature was used for the heating cycle, and 95 F DB and 78 F wet bulb for the cooling cycle. The outdoor temperatures experienced during the 1935-36 heating season seemed to be typical for the Roanoke area. The maximum and minimum temperatures experienced during this period are given in an accompanying graph. It can be noticed that outdoor temperatures lower than the 15 F design temperature were experienced during the latter part of December 1935 and the latter part of January and the early part of

PHILIP SPORN and E. R. AMBROSE, president and air conditioning engineer, respectively, American Gas and Electric Service Corp., are foremost authorities on the heat pump. Much of the present interest in this nearly-a-century-old method is undoubtedly due to their work. They describe here a heat pump installation supplying year 'round air conditioning for a modern six story office building. The installation is of particular note because outdoor air is the heat source in winter, the heat "sink" in summer

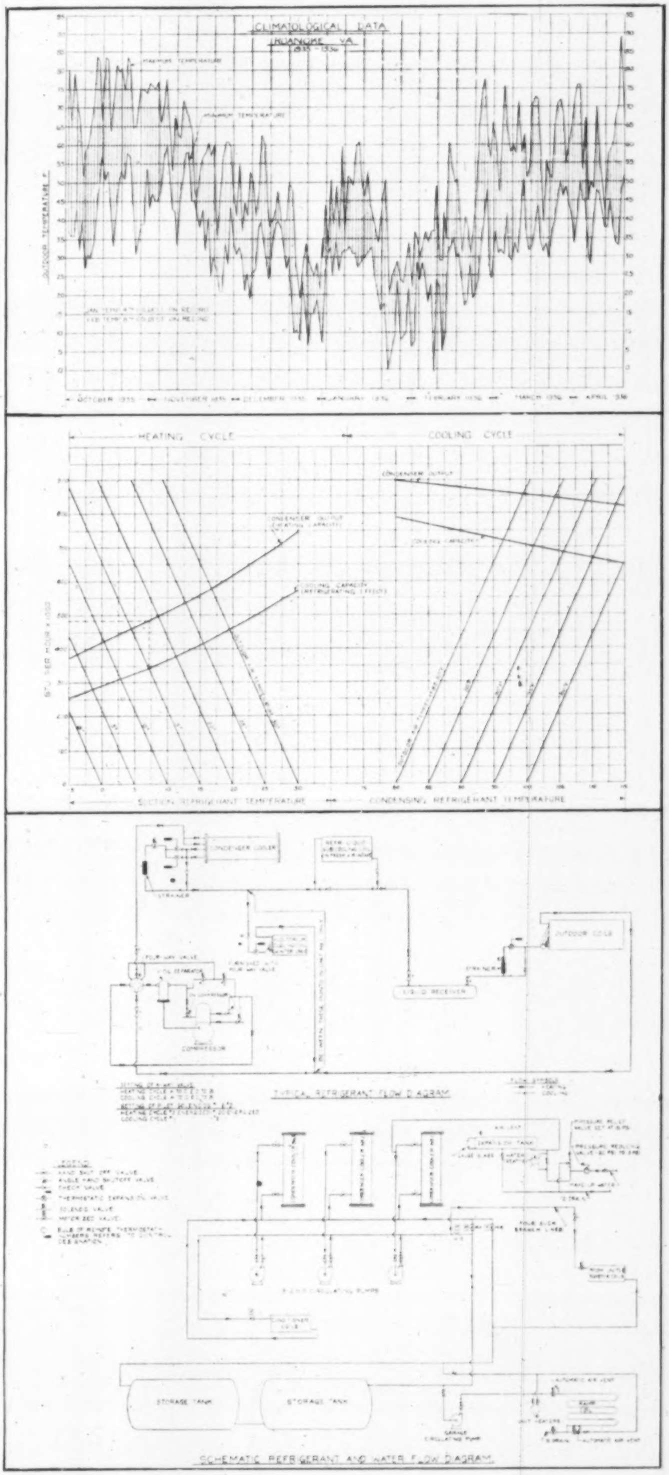
February 1936. To obtain an economical equipment selection, a storage tank filled with warm or cold water depending on the season was used to provide the additional heating or cooling when the selected design temperatures are exceeded.

Using the design temperatures of 15 F DB for heating and 95 F DB and 78 F WB for cooling, the heat loss was calculated to be 1.41 million Btu per hr and the heat gain 2.079 million Btu per hr. The breakdown of these totals is given in the accompanying table.

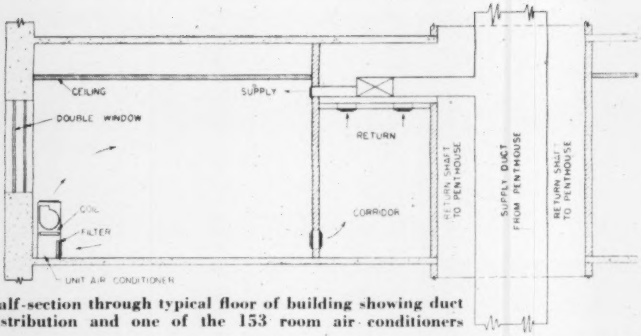
Heating and Cooling Requirements

	Heat gain, Btu per hr	Heat loss, Btu per hr
Sensible:		
Conduction and Sun effect: Walls	4,000	
Conduction and Sun effect: Windows	382,000	674,000
Conduction and Sun effect: Floors & roof	62,000	
Lights	531,000	
Ventilation air	275,000	736,000
People	195,000	
Latent:		
Ventilation air	480,000	
People	150,000	
Total	2,079,000	1,410,000
Design conditions:		
Heating:		
Indoor temperature		72 F
Outdoor temperature		15 F
Cooling:		
Indoor temperature	80 F and 50% RH	
Outdoor temperature	95 F and 78 F WB	

The expected Btu per hr heating output of one of the three heat pump units at various outdoor and suction saturated refrigerant temperatures is shown in an accompanying figure. The Btu per hr cooling output is also given at various outdoor and condensing saturated refrigerant temperatures. It can be seen that the heating output of one of the heat pump units is 470,000 Btu per hr at 15 F DB outdoor temperature, and cooling capacity is 670,000 Btu per hr at 95 F DB outdoor temperature. Since these capacities are approximately one-third of the total requirement



***Top*—The outdoor temperatures for the 1935-1936 heating season were deemed typical for the Roanoke area. *Center*—Heating and cooling capacities of one of the three heat pump units at various outdoor air temperatures, suction refrigerant temperatures and condensing temperatures. *Bottom*—One of the three refrigerant circuits is shown diagrammatically at the top, and a schematic refrigerant and water flow diagram is shown at the bottom**


CEILING
SUPPLY
DOUBLE WINDOW
RETURN
COIL
FILTER
CORRIDOR
UNIT AIR CONDITIONER
RETURN SHAFT TO PENTHOUSE
SUPPLY DUCT FROM PENTHOUSE
RETURN SHAFT TO PENTHOUSE

Half-section through typical floor of building showing duct distribution and one of the 153 room air conditioners

of the building, three such systems were selected and installed. The heating capacities given will be increased approximately 10 percent when the preheating of the ventilation air by subcooling the liquid refrigerant is included.

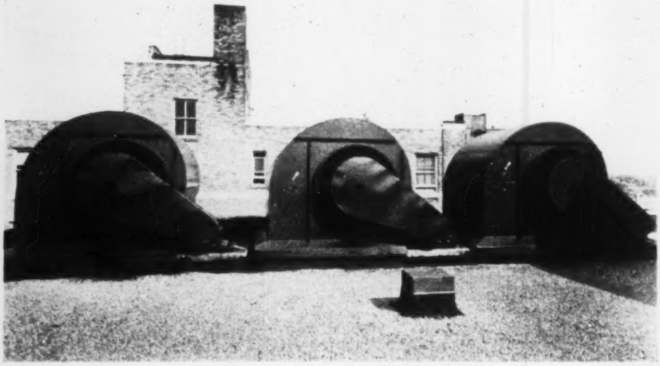
Three 75 Hp Compressors

The heat pump system consists of three 75 hp reciprocating "Freon-12" compressors each having its own heat dissipating and heat absorbing coils together with the necessary connecting piping installed to give three separate, independent, indirect systems. (Indirect, because water is used to transfer the heating and cooling effect from the refrigerant to the air in the conditioned space.) The three compressor-coil combinations will satisfy the heating requirements at outdoor temperatures of 15 F and above, and cooling requirements at outdoor temperatures of 95 F or below. When outdoor temperatures are below 15 F and above 95 F (which occur for short durations at infrequent intervals) the two water storage tanks filled with hot or cold water, depending on the cycle, will supplement the compressor capacity. The storage tanks are charged at mild outdoor temperatures when the excess compressor capacity is available.

Duct System and Unit Conditioners

The distribution scheme from the heat pump equipment in the pent house to the various portions of the building consists of a forced air circulation system supplemented by small unit room air conditioners along the external walls. The forced air circulation system (consisting of a fan, self-cleaning filters, water coils and motorized dampers) furnishes the heating and cooling to the internal space and in addition supplies all of the building ventilation air. The fan delivers the outdoor-recirculated air mixture through the filters, over the water coils, and into sheet metal supply ducts which connect to outlet grilles throughout the building.

Three fans on the pent house roof furnish the outdoor air which is the heat source. The fans discharge the air vertically downward to the coil housing in the pent house



The horizontal air distribution duct in the corridor connects to one main supply duct located in a vertical shaft which extends from the basement to the pent house. This vertical shaft is also used to return the air from the conditioned space to the pent house. The main supply duct furnishes conditioned air to the entire building except the auditorium which is supplied by a separate duct system. Since the heating and cooling requirements of the first floor, sixth floor and auditorium are different from the remainder of the space, booster coils are located in the supply ducts to these areas.

The exhaust system for the toilets and auditorium kitchen consists of exhaust grilles connected to an exhaust fan in the pent house by means of sheet metal ducts. The exhaust from the fan is discharged to the outside. Two propeller exhaust fans are also located on the side wall of the garage to ventilate this space.

The Refrigerant and Water Piping

During the heating cycle the high temperature, high pressure refrigerant gas from the compressor passes through the oil separator and four-way valve to the condenser-cooler where it is liquefied, giving up its latent heat to the circulating water. The condensed refrigerant passes on to the liquid receiver, then through the expansion valves and outdoor coil where it changes to a low temperature, low pressure gas by absorbing heat from the outdoor air. From the outdoor coil the refrigerant gas returns through the four-way valve to the compressor.

During the cooling cycle the high temperature, high pressure refrigerant gas from the compressor passes through the oil separator and four-way valve to the outdoor coil where it is liquefied, giving up its latent heat to the outdoor air. The condensed refrigerant passes on to the liquid receiver, then through the expansion valves to the condenser-cooler where it changes into a low temperature, low pressure gas by absorbing heat from the circulating water.

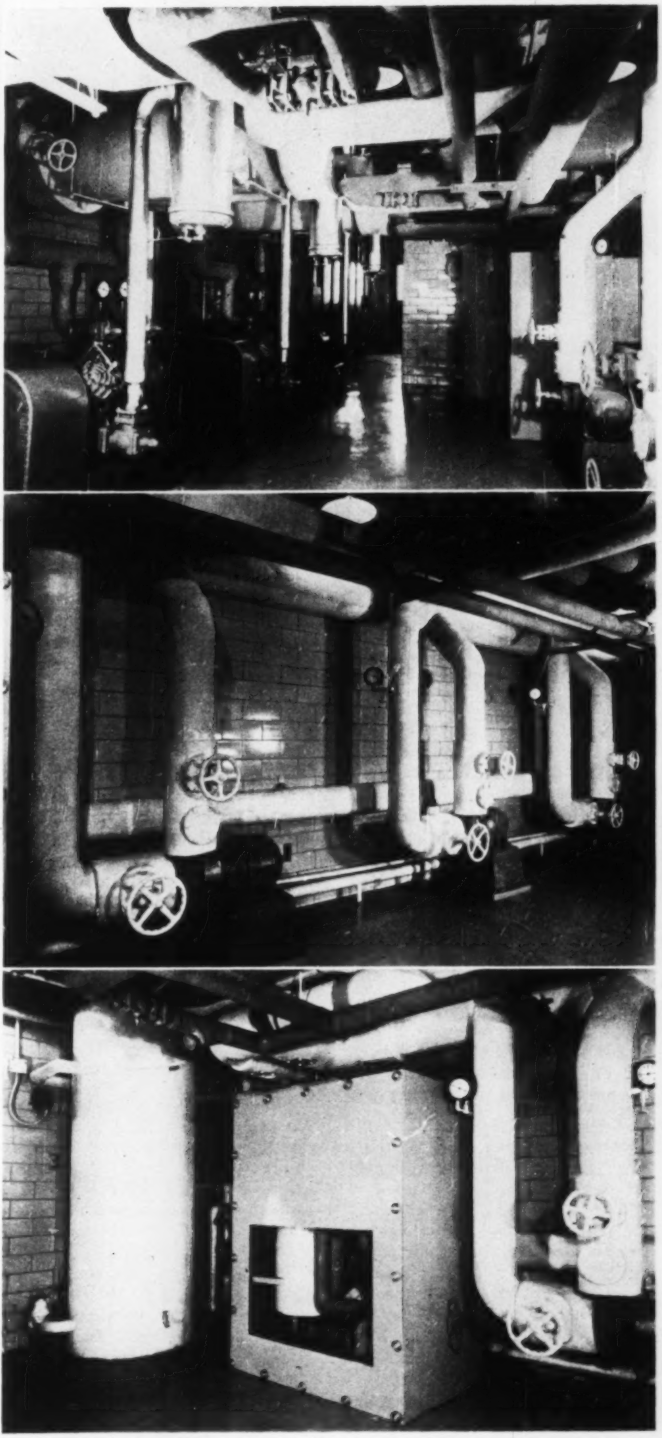
During the heating cycle when the outdoor coil needs defrosting, the path of the refrigerant is the same as the cooling cycle going first to the outdoor coil, then to the liquid receiver, through the expansion valves to the condenser cooler, then back to the compressor.

There is a booster refrigerant coil in the supply duct to the auditorium which furnishes cooling to the auditorium when the main system is on the heating cycle, and heating when the main system is on the cooling cycle.

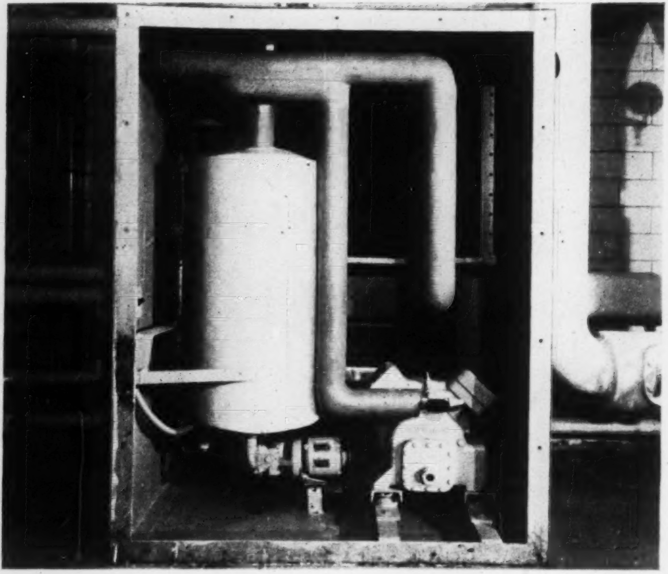
The room air conditioners include a recirculating air fan, filters and a water coil through which warm or cold water is circulated. Each room unit is under control of its corresponding thermostat in order to satisfy independently the requirements of the particular space in which it is located.

The water inlets of the three condenser-coolers and the discharges of the three circulating pumps have common headers to obtain parallel flow. The two water storage tanks in the basement are connected in the water circuit to supplement the heating and cooling capacity of the refrigerating machines. The water from the storage tanks and/or the outlets of the condenser-coolers is circulated to the air conditioner units, the main conditioner coils and the booster coils in a closed loop. From the common headers in the pent house the water is circulated to the various coils by means of five separate parallel supply and return lines; a branch line supplies the self-contained air conditioner units on each of the four sides of the building, and the fifth supplies the coil in the pent house conditioner unit. The flow in each of the five branch lines is controlled by means of a manual operated valve.

The garage is heated (no cooling) by circulating water from the storage tank through ceiling type unit heaters. A fourth pump is provided to circulate this water independently of the main system. Also, warm water from the garage system can be circulated through em-



***Top*—Major equipment in the pent house, with the three compressors on the left and one of the three circulating pumps in the right foreground. Above the compressors are the condenser-coolers, the four-way reversing valves, and the oil separators. *Center*—The three 5 hp circulating pumps and the connecting piping. *Bottom*—Domestic water for the entire building is heated by the heat pump shown here with the 300 gal insulated storage tank**



Heat pump water heater with front cover removed to show compressor at right and refrigerant-water heat exchanger on left. Underneath the heat exchanger is a pump which circulates the water between the heat exchanger and the 300 gal storage tank. The heat absorbing coil is in the background at the top of the enclosure

bedded coils in the concrete ramp from the street to the garage floor.

Outdoor air is used as the heat source. Three fans, one for each system, are located on the pent house roof. The outdoor coil and housing are located directly below the fans on the floor of the pent house. The fans discharge the outdoor air vertically downward to the coil housing in the pent house. From the housing, the air passes over the coils back to the outdoors.

All of the heat pump equipment except the water storage tanks is located in the pent house on the roof of the sixth floor. The two water tanks are in the basement.

Heat Pump for Domestic Water

The domestic hot water supply for the entire building is heated by a heat pump, the air exhausted from the building serving as the heat source. This heat pump system is designed to heat 50 gph of water from 50 to 120 F. The heated water is stored in a 300 gal insulated tank. The exhaust air from the building goes in the housing at the bottom, then over the compressor and through the heat absorbing coil to the exhaust fan where it is discharged to the outdoors. The heat which is removed from the exhaust air by the heat absorbing coil is raised to a higher temperature and pressure by the compressor. From the compressor the gas is discharged into a water-refrigerant heat exchanger where it is liquefied, giving up its latent heat to the circulating water.

How Controls Function

An electric control system is employed to automatically supply year 'round air conditioning to the building.

An outdoor thermostat positions the system to the heating or cooling cycle. When the outdoor temperature is below the setting of the thermostat (approximately 65 F) the system is on the heating cycle and when the temperature is above this setting the system is on the cooling cycle.

Thermostats in the conditioned space operate one of the three water circulating pumps when heating or cooling is required. Immersionstats maintain the predetermined supply water temperature to the various surfaces by operating the compressors and their corresponding water circulating pumps. Outdoor thermostats permit only one compressor-water circulating pump combination to operate under light loads, two such combinations under medium loads, and all three systems under heavy loads.

Warm or cold water from the storage tank, depending on the cycle, is automatically mixed with the circulating water to maintain the desired water supply temperature when the compressor capacity is not sufficient to satisfy the requirements. The storage tanks are recharged, under control of an immersionstat in the tank, whenever the compressors are not required by the conditioned space.

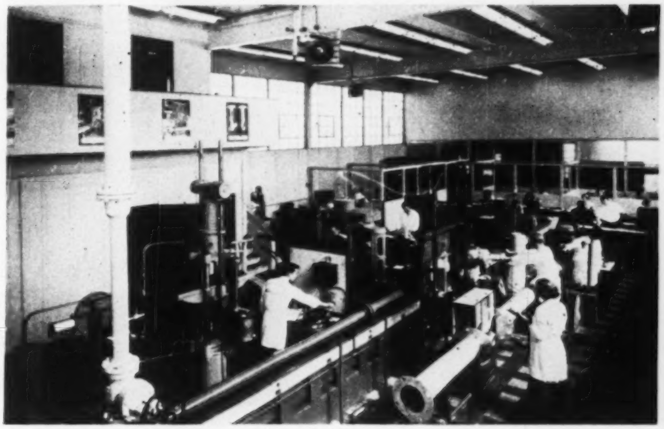
During the night cycle a clockstat stops the exhaust fan, reduces the ventilation air supply to a minimum, changes the conditioner fan to intermittent operation and permits maintaining a lower temperature in the conditioned space during the heating cycle and a higher temperature during the cooling cycle.

The outdoor coils are defrosted automatically during the heating cycle. If the outdoor air-refrigerant suction temperature differential exceeds a predetermined value, indicating accumulation of frost on the coils, the position of the four-way valve is changed so that the high temperature, high pressure refrigerant gas from the compressor goes first to the outdoor coil where it is condensed, giving up its latent heat to defrost the coils. The path of the refrigerant during the defrosting cycle is the same as that for the cooling cycle. The circulating water can continue to furnish heat to the conditioned space during the cycle by using water from the storage tanks.

The building was occupied during the first part of March 1949. Since that time complete operating and performance data have been recorded. These data include energy consumption of all equipment, compressor discharge pressure, compressor suction pressure, outdoor air temperature, and indoor air temperature. The system operated satisfactorily during the past cooling season. After the present heating season, these data will be correlated.

This heat pump system was engineered and designed by the American Gas and Electric Service Corp.

A view of the new physical laboratory, which is heated by suspended hot water unit heaters, taken from the balcony floor on which the air conditioning equipment is installed. The hookup in the right foreground is for checking flow and pressure drop in experimental and actual valve designs

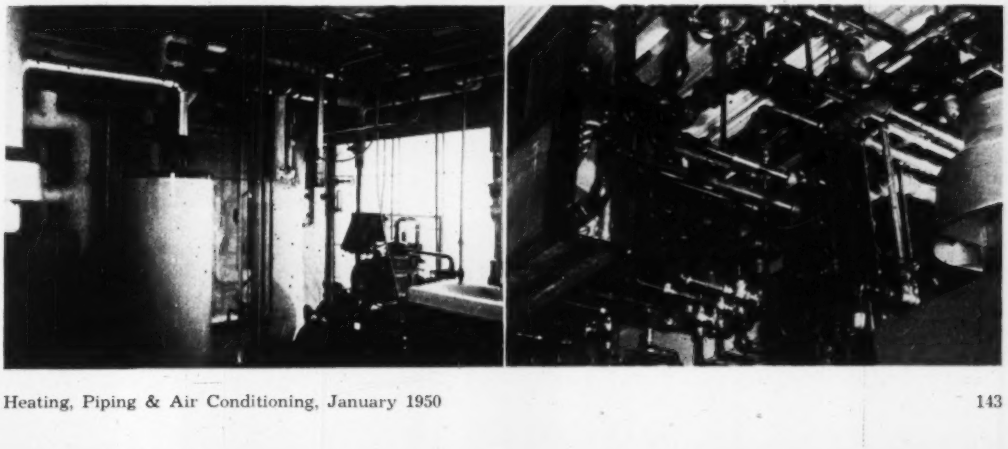


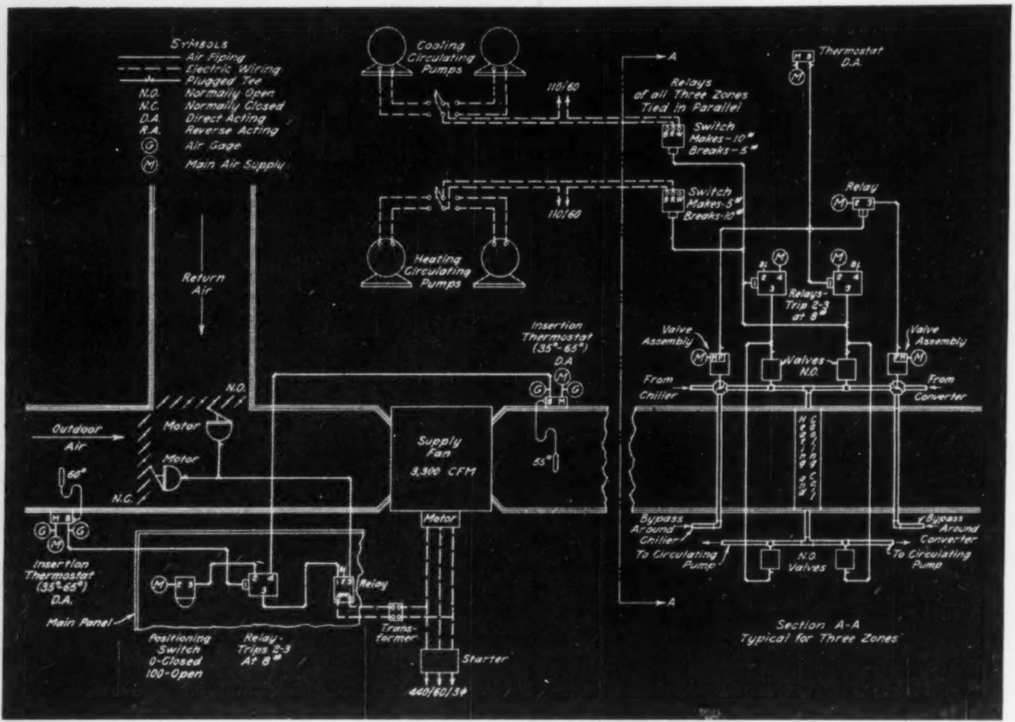
Air Conditioning Is Essential "Tool" at Steel Valve Research Laboratory

AIR CONDITIONING serves many purposes in modern plants and buildings. In industrial research laboratories, for example, it is often an essential both for "process" and for comfort.

The new steel valve research laboratory of Edward Valves, Inc., East Chicago, Ind. (a subsidiary of the Rockwell Mfg. Co.) is devoted exclusively to study of the special problems created by higher and higher design pressures and temperatures and includes several rooms in which temperature or humidity must be controlled. In the stress analysis room, brittle lacquer sensitive to temperature and humidity is used on bodies and parts in order to study stresses in them; it is thus necessary to maintain constant atmospheric conditions, the room temperature being held within 3 deg. In the creep room, which has a heavy cooling load, it is necessary to hold the room temperature constantly at 70 deg for the sake of the accuracy of the controls which govern the furnaces in which the stressed steel

***Left*—A view of the heating and air conditioning installation, which serves laboratory rooms directly underneath this balcony floor. The insulated storage tank for chilled water is immediately to the left of the condensing unit. *Right*—This close-up, taken before completion of the installation, shows some of the numerous valves and fittings for controlling and conveying hot or chilled water to the heating and cooling coils**




Symbols
Air Piping
Electric Wiring
Plugged Tee
N.O. Normally Open
N.C. Normally Closed
D.A. Direct Acting
R.A. Reverse Acting
G Air Gage
M Main Air Supply
Cooling Circulating Pumps
110/60
Relays of all Three Zones Tied in Parallel
Switch Makes-10# Breaks-5#
Switch Makes-5# Breaks-10#
Thermostat D.A.
Relay
Heating Circulating Pumps
Return Air
Insertion Thermostat (35°-65°) D.A.
Relays-Trip 2-3 at 8#
Valve Assembly
Valves N.O.
From Chiller
From Converter
N.O.
Outdoor Air
Motor
Motor
60°
N.C.
Supply Fan 3,300 CFM
55°
Heating and Cooling Coil
Bypass Around Chiller
Bypass Around Converter
To Circulating Pump
N.O. Valves
To Circulating Pump
Insertion Thermostat (35°-65°) D.A.
Main Panel
Relay
Motor
Transformer
Starter
440/60/3φ
Positioning Switch 0-Closed 100-Open
Relay-Trips 2-3 At 8#
A
A
Section A-A Typical for Three Zones

Here is a simplified diagram showing the method of controlling the heating and cooling system (drawn from a print furnished through the courtesy of Minneapolis-Honeywell Regulator Co.)

specimens are heated to elevated temperatures. Thirty air changes per hour are used for this room. In the metallographic room—which contains microscope equipment for examination of metals at high magnifications, a dilatometer for measurement of thermal expansion and phase changes, and a polariscope for stress analysis of plastic models—air conditioning is required for the comfort and efficiency of the occupants. In addition, two darkrooms are comfort conditioned and the faucet water temperature is thermostatically controlled at 68 F both summer and winter.

Dampers in the outdoor air and return air ducts are modulated by a discharge air controller during the heating season to maintain a temperature of 55 F entering the coil. During the cooling season, a minimum amount of outdoor air, as set by an adjustable positioning switch, is taken in. This switchover is accomplished automatically by a control located in the outside air.

The air conditioning installation is divided into three zones, with a coil using either hot or chilled water serving each zone. Thus, one zone can be on heating and the others on cooling at the same time.

Source of the chilled water is an insulated storage tank held constantly at 40 F and served by a 7½ hp compressor unit. A thermostat stops the compressor if the water temperature drops to 35 deg. Hot water is supplied the coils by means of a heat exchanger or converter served by plant steam, the water temperature being held at 180 deg. A gas fired heater, through which the water from the heat exchanger circulates before going to the coils, comes on automatically at 170 F during weekends or other periods when plant steam is not available.

Four Valves on Each Coil

The water supply temperatures are fixed, so the quantity of hot or cold water from the heat exchanger or storage tank is mixed with bypassed water to vary the temperature of the water circulated through the coils to meet the requirements of the rooms served. Each coil is equipped with two "heating" valves and two "cooling" valves, one of each on the inlet and one of each on the outlet of the coil. Each pair opens or closes simultaneously under pneumatic control, to open or close both the inlet and outlet of the coil.

In addition to these valves on the coil inlets and outlets, there are three-way valves to control the flow of the circulating water.

A fan circulating 3300 cfm supplies the air conditioned rooms through short duct runs, as the heating and cooling equipment is installed on a balcony or mezzanine floor at one end of the laboratory building, under which the rooms are located. The general laboratory space, two stories in height, is heated by suspended hot water type unit heaters thermostatically controlled.

Bachman & Bertram, Hammond, Ind., were the architects and engineers for this laboratory building.

AGRICULTURE
POULTRY

Southwest Air Conditioning Exposition . . . 56th Annual Meeting of the American Society of Heating and Ventilating Engineers

SHOW SECTION

DALLAS - January 23-27

The ASHVE Texas Special heads for Dallas for the 56th annual meeting and the Southwest Air Conditioning Exposition

BIG WEEK IN DALLAS

Solar heating, heat pumps, night cooling, physiological reactions to environment, radiant heating—these are some of the technical subjects to be discussed at the 56th annual meeting of the American Society of Heating and Ventilating Engineers in Dallas this month.

Five technical sessions will include the presentation of 12 papers by outstanding scientists and engineers. During the first technical session—Monday morning, January 23, at the Baker Hotel—amendment of the society by-laws will be considered by the membership. On the same day, at 2:00 p.m., the Southwest Air Conditioning Exposition will open its doors at the Hall of Agriculture and the Poultry Building in the State Fair Park. Regular bus service from the downtown hotels will be provided.

The scheduled events (see program) will be held in the Hotel Adolphus and the Baker Hotel. While the technical sessions are going on, wives and guests of ASHVE members may participate in the special events scheduled for the ladies. At 2:30 p.m., Sunday, January 22, there will be a ladies' get-together in the Texas room of the Baker. On Tuesday, January 24, in the Mural room of the Baker, there will be a luncheon and style show at 12:30 p.m. On Wednesday, at 1:45 p.m., the ladies will attend a matinee in "Theater '50" when Margo Jones presents "My Granny Van".

Following tradition, the climax of the annual meeting will be the annual banquet at 7:00 p.m. Wednesday evening, January 25, with Dr. Umphrey Lee, president of Southern Methodist University, as the speaker. Presentation of the F. Paul Anderson medal will be made to Dr. C.-E. A. Winslow, New Haven, Conn., who is a past president of the society, editor of the American Journal of Public Health, and professor emeritus of public health at the Yale University school of medicine. Following the banquet there will be dancing.

At the welcome luncheon on Monday, January 23, the speaker will be Jeff Williams, the "Oklahoma Cowboy", who will give an informal talk. The speaker at the luncheon meeting on Tuesday, January 24, will be K. C. Richmond, Chicago, editor of Coal-Heat magazine and an ASHVE member. Mr. Richmond will speak on "the meaning of the human equation" in heating and air conditioning.

On the last day of the four-day meeting, newly elected officers will be installed at the final technical session on Thursday. Throughout the meeting, there will be various gatherings of executive officers, the council, the chapter delegates and the many technical advisory committees. Past presidents of the society will hold their traditional dinner Tuesday evening.

Inspection Trips Scheduled

Members and guests are invited to make tours of the Kirby building, the Mercantile Bank building, and the Lone Star Gas building. There is no charge, and all of the buildings are within walking distance of the headquarters hotels.

On Thursday afternoon, an inspection trip will be made to Alford refrigerated warehouse, "world's largest refrigerated space under one roof." Transportation from the Baker and the Adolphus will be furnished.

Each building has its own particular feature. The Lone Star Gas installation will be the largest absorption system in Dallas. The Mercantile Bank is the largest overall system. The Kirby building represents the only office building with a complete boiler plant, refrigeration plant and all equipment machine room on the roof of the building. The Alford warehouse contains 1100 tons of low suction refrigeration; heating of office space is by engine jacket water.

A trip has been planned to the East Texas oil fields, leaving Love Field at noon on Thursday, January 26, flying in either a DC-6 or DC-4 (or both) furnished by Braniff Airways, and arriving in Longview approximately 45 minutes later after circling the oil fields. From this point, bus service will transport the passengers to Kilgore, Longview, Gladewater and surrounding territories, where they will be able to see gas pumping stations, oil wells in operation, gas flares burning the surplus gases, and other interesting sights.

The trip in the buses will take approximately 2½ to 3 hours. At the end of the trip the passengers will be returned to the Longview airport and flown back to Dallas, arriving between 4:30 and 5:00 p.m.

A post-meeting, all-expense tour by rail or air is also scheduled for ASHVE members and friends and will include a visit to Mexico City and the Guadalupe Shrine.

PROGRAM FOR ASHVE MEETING

Sunday—January 22

10:00 a.m. RECEPTION & REGISTRATION (Mezzanine—Baker)

10:00 a.m. Committee on Research (Baker)
Council (Adolphus)

2:30 p.m. Ladies Get-Together (Texas Room—Baker)

4:30 p.m. Chapter Delegates (Adolphus)

Monday—January 23

8:30 a.m. REGISTRATION (Mezzanine—Baker)

9:30 a.m. FIRST SESSION (Ballroom—Baker)
Call to Order
Greetings
Response by Alfred E. Stacey, Jr., President
Reports of Officers and Council
Night-Air Cooling, by F. E. Giesecke
Physiologic Examination of the Effective Temperature Index, by Nathaniel Glickman, Tohru Inouye, R. W. Keeton, M. K. Fahnestock
Amendment of By-Laws

10:30 a.m. Ladies Assembly (Texas Room—Baker)

12:30 p.m. Welcome Luncheon (Ballroom—Adolphus)
Speaker—Jeff Williams

2:00 p.m. Opening of Exposition at State Fair Grounds

2:30 p.m. Chapter Delegates (Adolphus)

7:00 p.m. Chuck Wagon Dinner — Entertainment — Dancing

Tuesday—January 24

9:00 a.m. REGISTRATION (Mezzanine—Baker)

9:30 a.m. TECHNICAL SESSION (Ballroom—Adolphus)
Report of Tellers of Election
Thermodynamic Criteria for Heat Pump Performance, by John F. Sandfort
Evaluating Heat Pump Performance, by F. R. Ellenberger, A. B. Hubbard, W. R. Foote, F. Burggraf, J. J. Martin, Jr.
Condensation on Prefabricated Walls, by E. R. Queer and E. R. McLaughlin

12:30 p.m. Luncheon Meeting (Adolphus)
Speaker—K. C. Richmond, Editor, Coal-Heat Magazine

12:30 p.m. Ladies Luncheon and Style Show (Mural Room—Baker)

2:00 p.m. Chapter Delegates (Adolphus)

6:30 p.m. Past Presidents' Dinner (Adolphus)

Wednesday—January 25

9:00 a.m. REGISTRATION (Mezzanine—Baker)

9:30 a.m. TECHNICAL SESSION (Ballroom—Adolphus)
Solar Heating of Houses by Vertical South Wall Storage Panels, by A. G. H. Dietz and Edward Czapek
Removal of Lighting Loads by Panel Cooling, by Merl Baker
Baseboard Radiation Performance in Occupied Dwellings, by G. S. MacLeod and C. E. Eves

1:45 p.m. Leave Hotel Baker—Ladies Theater Party—Margo Jones presents: My Granny Van

2:00 p.m. TECHNICAL SESSION—(Ballroom—Adolphus)
Report of Committee on Research
Panel Heating Research Report on Experimental Techniques and Results of Heat Flow Within a Concrete Panel and Heat Flow Analysis for Buried Pipes
Effect of Panel Location on Skin and Clothing Surface Temperature, by L. P. Herrington and R. J. Lorenzi

7:00 p.m. ANNUAL BANQUET (Ballroom—Baker)
Speaker—Dr. Umphrey Lee, President, Southern Methodist University

Thursday—January 26

9:00 a.m. REGISTRATION (Mezzanine—Baker)

10:00 a.m. TECHNICAL SESSION (Ballroom—Adolphus)
Resistance Gradients Through Viscous Coated Air Filters, by F. B. Rowley and R. C. Jordan
Fitting Losses for Extended Plenum Forced-Air Systems, by H. H. Korst, N. A. Buckley, S. Konzo, R. W. Roose
Vaneaxial Fan Fundamentals, by Raymond Mancha
Unfinished Business
New Business
Resolutions
Installation of Officers
Adjournment

12:30 p.m. Nominating Committee Luncheon (Adolphus)

12:30 p.m. Council Luncheon (Adolphus)

Committee on Arrangements

C. Rollins Gardner, *General Chairman*
G. A. Linskie, *Vice Chairman*

Banquet—M. L. Brown, *Chairman;* J. P. Dillard, J. R. Dowdell, W. E. Frost, E. J. Stern.

Entertainment—R. E. Allison, *Chairman;* A. B. Carter, V. C. Kneese, James O'Connor, Jr., A. A. Stone, J. L. Tye.

Exposition—Oslin Nation, *Chairman;* W. R. Barbeck, S. S. Brandt, N. R. Collins, Jr., F. L. Gray, Jr., R. G. Lyford.

Finance—E. T. Gessell, *Chairman;* J. B. Lowe, J. F. Marshall, R. R. Matthews.

Ladies—T. H. Anspacher, *Chairman;* R. R. Brient, Jr., R. A. Mixon, J. D. Poythress. *Assisted by:* Mmes. T. H. Anspacher, J. P. Ashcraft, W. R. Barbeck, Herman Blum, Jr., M. L. Brown, J. P. Dillard, C. Rollins Gardner, E. T. Gessell, D. C. Kieffer, V. C. Kneese, G. A. Linskie, Oslin Nation, J. A. Ray, P. N. Vinther.

Honorary Chairmen
F. E. Giesecke   Reg F. Taylor

Publicity—J. P. Ashcraft, *Chairman;* D. L. Echols, E. J. Hatzenbuehler.

Reception—W. R. Barbeck, *Chairman;* S. E. Ammons, A. F. Avera, J. A. Bishop, M. W. Brown, H. M. Cunningham, E. E. Farrow, D. W. Harrington, T. M. Jones, R. C. Knight, B. W. Levy, C. H. McLeod, M. J. Murray, H. G. Walcott, K. L. Wilson.

Sessions—P. N. Vinther, *Chairman;* J. W. Lacy, D. C. Pfeiffer, R. A. Walker.

Special Events—Herman Blum, Jr., *Chairman;* R. M. Burgess, Fred Downs, R. A. Mayes, I. P. Newby.

Transportation—J. A. Ray, *Chairman;* C. F. Gilmore, M. O. Tessman, Jr., C. C. Young.

EXPOSITION EXHIBITORS AND THEIR EXHIBITS

Here Are The names of the exhibitors who are scheduled for the Southwest Air Conditioning Exposition of the International Heating & Ventilating Exposition, per latest advice at press time from the exposition management. Those listed with information on the products they will exhibit and the names of representatives who will be in attendance furnished these details direct to the publisher. With the booth numbers and the accompanying diagrams of the exhibit halls on the following pages, the location of each exhibitor can be quickly spotted.

The exposition is under the management of the International Exposition Co., Charles F. Roth, manager, E. K. Stevens, associate manager.

ACME INDUSTRIES, INC., 600-618 N. Mechanic St., Jackson, Mich.—Booth 103.

In attendance: K. A. Weatherwax, A. B. Newton, J. T. Maloney, E. B. Dunphy, Leo J. Freitas, L. W. Lashley, L. S. Pawkett, L. W. Ellis, Ferris Kennedy.

Exhibiting: Evaporative condenser, "Dry-Ex" water cooler, fin coils, cooling tower, oil separators, heat exchangers, "Freon" and ammonia condensers, shell and tube condensers, shell and coil condensers.

AETNA INDUSTRIAL CORP.—see TRIMONT MFG. CO.

AFFILIATED GAS EQUIPMENT INC., DAY & NIGHT DIV., Monrovia, Calif.—Booth 360 (see also Bryant Heater Div. and Payne Furnace Div.)

AIR DEVICES, INC., 17 E. 42nd St., New York 17, N. Y.—Booth 220.

In attendance: C. N. O'Day, G. J. Sweeney.

Exhibiting: "Agitair" air filters; grease filters; square, rectangular and circular air diffusers; and wind actuated exhausters. New "CNO" exhausters and new dampers for circular, square and rectangular air diffusers will be featured.

AIR-MAZE CORP., 5200 Harvard Ave., Cleveland 5, Ohio—Booth 105.

In attendance: W. B. Watterson, N. L. Lamprecht, C. D. Collins.

Exhibiting: "Electromaze" electric air filter; "Air-Maze" air filter panels.

AIRTEMP DIV.—see CHRYSLER CORP.

A-J MFG. CO., 2119 Washington St., Kansas City 8, Mo.—Booths 325-327.

In attendance: Arthur S. Hurt, Jr., Anton Artmaier, Ernest S. Preuitt.

Exhibiting: Air conditioning and heating registers and grilles, diffusers, architectural grilles.

ALDRICH CO., Williams St., Wyoming, Ill.—Booths 329-331.

In attendance: P. M. Stephenson, E. L. Fox, B. Mulder.

Exhibiting: "Heat Pak" high pressure oil burners, and boiler-burner units for oil or gas firing with burners readily interchangeable. "Bantam" boiler-burner unit, rated at 100,000 Btu per hr output, will be featured.

ALLAN ENGINEERING CO., Midway Rd. & Allan Lane, Dallas, Tex.—Booths 267-269.

In attendance: Walter J. Allan, Dick Ryan, Wm. T. Blair, Jim Briggle, Bill Ross.

Exhibiting: "FAF" central heating system; new "Cabinette" central heating system; new gas unit heater; new "Yearound" central system.

ALLIS-CHALMERS MFG. CO., Milwaukee 1, Wis.—Booth 820.

In attendance: Walter A. Meyer, Harvey Reinhard, J. L. Pratt, H. L. Reynolds, M. L. Murdock.

Exhibiting: Cutaway view of 2 by 2 in. "Electrifugal" pump with new design features; 6 by 6 in. single stage, double suction pump; 1 by ¾ in. close coupled, low head, single stage coolant and circulating pump; automatic "Vari-pitch" drive; sheaves; and starters.

ALLIS CO., LOUIS, 427 E. Stewart St., Milwaukee 7, Wis.—Booth 733.

In attendance: H. L. Land, J. J. Butler, R. C. Brown, C. G. Skidmore, Louis Allis, Jr., Ted Wieseman, Ralph Owen, Jim Daganhardt, R. C. Wareham.

Exhibiting: New gear motors (single, double and triple reduction); "Ajusto-Spede", new "Servatron" d-c variable speed drive; splashproof motor; standard open motor; vertical "P-base"; cut-away explosionproof motor.

ALTON MFG. CO., 1112 Ross Ave., Dallas 2, Tex.—Booth 313.

In attendance: A. Ward Thornton, B. P. Edelman, P. R. Holmes, M. L. Ethridge.

Exhibiting: Refrigerated air conditioner (25 ton package unit complete with evaporative condenser built-in), air washer type evaporative cooler. Special "Turbospray" water distribution assembly for evaporative cooling units will be featured.

ALUMINUM COMPANY OF AMERICA, 801 Gulf Bldg., Pittsburgh 19, Pa.—Booth 724.

AMERICAN AIR FILTER CO., INC., 215 Central Ave., Louisville 8, Ky.—Booths 416-420.

In attendance: H. W. Pound, S. H. Fain, H. J. Noles, James W. May, Chas. D. Wright, C. W. Beatty, L. S. Gilbert, Jack Davis, Dallas S. Deem, H. J. Dalton.

Exhibiting: "Electro-Matic", "Electro-Cell", "Electro-PL", "Multi-Duty", "Auto-Airmat", "Deep Bed", "PL-24", "Amer-glas disposable filter"; and unit filters. Featured will be a new air filter using "Airmat" media as a travelling curtain for the collection of lint and dust of a similar nature, the unwinding of the clean media and the rewinding of the dust loaded media being automatic, and a new disposable filter utilizing non-combustible media housed in a cardboard container.

AMERICAN ARTISAN, 6 N. Michigan Ave., Chicago 2, Ill.—Booth 315.

In attendance: F. P. Keeney, Chas. E. Price, W. J. Osborn, G. C. Cutler, J. D. Thomas.

Exhibiting: American Artisan magazine; market information.

AMERICAN COOLAIR CORP., Jacksonville 3, Fla.—Booth 706.

AMERICAN GAS ASSOCIATION, 420 Lexington Ave., New York 17, N. Y.—Booths 274-374-474.

In attendance: Clifford E. Hall.

Exhibiting: Trade association activities.

AMERICAN RADIATOR & STANDARD SANITARY CORP., P. O. Box 1226, Pittsburgh 30, Pa.—Booths 333-337.

In attendance: D. D. Couch, H. L. Spindler, Harold C. Day, W. G. Senit, Horace R. Gale.

Exhibiting: "Winterglo" winter air conditioner, radiators for the "Winterglo" winter air conditioner, "Wyandotte" gas fired winter air conditioner, "Shawnee" gravity furnace, blower-filter unit, "Seneca" winter air conditioner, baseboard radiant panels, small and large "Empire" gas boilers, "Arco" convector, cutaway model "Arcoliner" oil burner, "Budget" water heater, "Severn" all-purpose boiler, Detroit Lubricator Co. controls. "Stan-flame" gas conversion burner and "Navaho" floor furnaces will be featured.

AMERICAN SHEET METAL CO., 607-11 First Ave., Dallas 10, Tex.—Booth 804.

In attendance: Robert E. Allison, Pauline M. Johansen, Woodrow W. Jones, Dick Dunham.

Exhibiting: Ash trays made in the booth which will be given away.

AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS, 51 Madison Ave., New York 10, N. Y.—Booth 436.

In attendance: ASHVE staff members.

Exhibiting: ASHVE activities for the advancement and education of the profession membership, publications, research, and standards developed for benefit of the public.

AMES IRON WKS., Oswego, N. Y.—Booth 369.

In attendance: J. J. Doyle.

Exhibiting: 40 hp gas fired "Amesteam" generator, also smaller operating model. New 350 hp and 400 hp generators, for pressures of 15 to 200 lb and for firing with oil, gas or oil-gas combinations, will be featured.

ANEMOSTAT CORP. OF AMERICA, 10 E. 39th St., New York 16, N. Y.—Booth 401.

In attendance: F. J. Kurth, C. M. Wilson, V. F. Self, W. F. Peters, F. Honerkamp, R. F. Hayes, J. W. Molitor, L. S. Gilbert, Jack Davis, W. E. Boyd, L. S. Pawkett.

Exhibiting: Circular air diffuser; square air diffuser; "Anemotherm" air meter.

APRIL SHOWERS CO., INC., 4126 Eighth St., N. W., Washington, D. C.—Booth 810.

In attendance: Jack Justice, Arthur Post, Leonard H. Holder, Robert Porter, W. J. Way II.

Exhibiting: Roof cooling systems and patented air cleaned nozzles, and featuring ranch house special application and air conditioning water saver.

ARMSTRONG CORK CO., Lancaster, Pa.—Booth 424.

In attendance: E. J. Stern, W. F. Nash, C. C. Lucas, E. M. Asbury, W. H. Busch.

Exhibiting: Low temperature and heat insulation materials for the air conditioning field, featuring construction details affecting air conditioning installations.

ARMSTRONG MACHINE WKS., 874 Maple St., Three Rivers, Mich.—Booth 428.

In attendance: O. E. Ulrich, T. H. Rea, Walter B. Allan.

Exhibiting: Glass model of steam trap operating at 6 lb pressure; humidifiers; gas purgers; and featuring room thermostat and water thermostat.

ARMSTRONG PRODUCTS CORP., P. O. Box 940, Seventh Ave. & First St., Huntington 12, W. Va.—Booths 251-253.

In attendance: L. O. Reese, M. S. Nicholson.

Exhibiting: Gas space heaters.

AUTOMATIC FIRING CORP., 6504 Olive Blvd., St. Louis 5, Mo.—Booth 800.

AUTOMATIC PRODUCTS CO., 2450 N. 32nd St., Milwaukee 10, Wis. Booth 624.

In attendance: R. W. Johnson, E. A. Vallee, A. A. Schubert, R. H. Ludwig, D. Moerick, L. C. Thompson, R. E. Petersen, R. E.

Morton, A. L. Neva, H. D. Youmans, W. H. Cody, A. L. Cody.
Exhibiting: Gas heating equipment, oil burners and accessories, air equipment (including warm air heating equipment), air conditioning equipment, control instruments, refrigeration machinery.

BAKER REFRIGERATION CORP., South Windham, Maine—Booth 728.

BALTIMORE AIRCOIL CO. INC., 715 W. Pratt St., Baltimore 1, Md.—Booth 729.
In attendance: John Engalitcheff, Jr., Ray R. Forseille.
Exhibiting: New 1950 models of evaporative condensers, one of them featuring a direct driven fan. New line of evaporative condensers extending from 105 to 210 tons in a single unit will be announced.

BARBER-COLMAN CO., 229 Loomis St., Rockford, Ill.—Booth 207.

BAR-BROOK MFG. CO., INC., 6133 Linwood Ave., Shreveport, La.—Booth 631.
Exhibiting: Attic and window fans.

BAUER & BLACK—see POLYKEN INDUSTRIAL TAPE DEPT.

BELL & GOSSETT CO., Morton Grove, Ill.—Booth 303.
In attendance: E. J. Gossett, C. E. Pullum, R. E. Moore, R. A. Patterson, Frank C. Hackett, W. A. Boone, L. L. Arbuckle, Frank Gall.
Exhibiting: Working display of refrigeration components; industrial line of centrifugal pumps; forced hot water heating products, including boosters, relief and reducing valves, "Monoflo" fittings, "Airtrol" system, "Flo-control" valves, etc.

BLACK & DECKER MFG. CO., Towson 4, Md.—Booths 259-261.
In attendance: E. V. Schaub, Ross Martain, K. L. Pendleton, R. J. Johnston.
Exhibiting: Drills, sanders, shears, screw drivers, saws, hammers, bench grinders, and portable grinders, featuring 7 in. junior sanders and 12 ga "Porto-Shear."

BRONSON MFG. CO., 1237 Riverside Dr., Los Angeles 31, Calif.—Booth 123.

BRYANT HEATER DIV., AFFILIATED GAS EQUIPMENT, INC., 17825 St. Clair Ave., Cleveland 10, Ohio—Booths 459-461-463-465.
In attendance: R. A. Bissell, H. A. Kennedy, R. E. Duncan, J. M. O'Connor, J. C. Boyd, W. E. Boyd, S. H. Baldwin, L. S. Pawkett, W. N. Rast, R. C. Anderson, E. A. Smith, W. J. Leaumont, J. J. Rose, J. M. Johnson, A. W. Seier, Jr., P. J. Schaack, Russell Lyle, J. P. Cain, J. V. Ferguson, J. N. Crawford.
Exhibiting: Steam and water boilers, winter air conditioners, conversion burners, gravity furnaces, floor furnaces, unit heaters, wall heaters, space heaters, water heaters. "All-Weather" conditioner and oil fired winter air conditioner will be featured.

BUNDY TUBING CO., 8109 E. Jefferson, Detroit 14, Mich.—Booth 619.
In attendance: P. A. O'Connell, W. F. Kendall, A. F. Berntha.
Exhibiting: Copper brazed, double wall "Bundyweld" tubing for radiant heating applications.

CARRIER CORP., 302 S. Geddes St., Syracuse 1, N. Y.—Booths 703-707-711.
In attendance: O. W. Bynum, C. U. Spriggs, J. A. Gazelle, C. V. Fenn, A. E. Stacey, W. H. Steitler, J. N. Gillham.
Exhibiting: First public display of 300 ton absorption machine, a steam operated refrigeration machine using plain water as a refrigerant; gas fired unit heater; system "Weathermaker", (nominal 31 ton); 5 hp self-contained "Weathermaker"; ½ ton window model room air conditioner; ¾ ton window model room air conditioner; ice cube maker; conduit "Weathermaster" (display model); food freezer; heavy-duty medium speed reciprocating compressor for ammonia or "Freon," 100 to 150 ton capacity.

CENTURY ELECTRIC CO., 1806 Pine St., St. Louis 3, Mo.—Booths 460-462.
In attendance: E. S. Moore, G. C. Henderson, A. Neher, Oliver S. Imes, V. G. Cox, W. B. Hill.
Exhibiting: Electric motors.

CHAR-GALE MFG. CO., Minneapolis 6, Minn.—Booths 822-824.

CHEMICAL ENGINEERING CO., 2800 Logan St., P. O. Box 1076, Dallas 1, Tex.—Booth 826.
In attendance: Webster Blocker, C. K. Hoffmeister, R. F. Thompson, G. A. Amberson, J. W. Potts.
Exhibiting: Water conditioning equipment, softeners, filters, chemical feeders, water conditioning chemicals, for cooling water, brines, boilers, for algae control, for chemically removing scale and other heat exchange deposits; water conditioning equipment; "Chenco" water conditioning compounds, scale solvent, and "Kil-Mos" algaecide.

CHRYSLER CORP., AIRTEMP DIV., 1600 Webster St., Dayton 1, Ohio—Booth 203.
In attendance: William C. Newberg, C. S. Stackpole, William B. Magill, G. S. Cobb, V. E. Houston, W. J. Snodgrass, M. P. Veith, J. B. Walden, R. L. Boyd.
Exhibiting: Air conditioning packaged units and central station systems, cooling towers, gas and oil fired heating equipment, conversion oil burners, gas fired furnaces.

CLIMAX MACHINERY CO., 301 S. La Salle St., Indianapolis 6, Ind.—Booth 213.
In attendance: Wm. J. Campbell, Robert S. Miller, H. C. Thomas, S. S. Robinson, E. H. Stedfeld, J. D. Sheehan, George Clark, M. H. Fuller.
Exhibiting: "Climax D-16" room cooler, new "Climax F-20" and "Climax B-22" home coolers; assorted sizes of evaporative coolers, including portable evaporative cooler.

CLOW & SONS, JAMES B., 201 N. Talman Ave., P. O. Box 6600 A., Chicago 80, Ill.—Booth 815.
In attendance: Milton T. Clow, A. J. Belew, S. W. Boyd.
Exhibiting: "Gasteam" radiators and gas-fired unit heaters, the latter having cast iron heat exchanger cast in one piece with combustion chamber.

COLEMAN CO., INC., 250 N. St. Francis, Wichita 1, Kans.—Booth 370.
In attendance: Dean Olds, Harry Giwosky, Shirley Campbell, V. D. Call, Jack Kice, Ed. G. Johnson, H. W. Morton.
Exhibiting: "Blend-Air" pre-engineered forced warm air heating system, combining high velocity heat conduits with low velocity room outlets: complete line of gas and LP gas floor furnaces; wall heaters; oil floor furnaces; space heaters; water heaters; central heating plants. Working "Blend-Air" display will be featured.

COMBUSTION CONTROL CORP., 77 Broadway, Cambridge 42, Mass.—Booths 255-257.
In attendance: Dan Colbath, L. R. Ward, John A. Long, L. D. Sibley, D. A. Warriner, R. A. Warriner.
Exhibiting: "Fireye" photoelectric and electronic flame failure safeguards and programming controls for industrial gas and oil burners; photoelectric smoke alarms and indicators for combustion control; photoelectric smoke detectors for air conditioning duct systems. New electronic flame failure safeguard for gas burners and new smoke indicator for combustion control will be featured.

COMFORT PRODUCTS CORP., 2220 S. Lamesa St., Dallas 2, Tex.—Booth 212.
In attendance: B. J. Spitzka, J. Sidney Jones, J. V. Mariner, Jr., Jack Cronk, Jack O'Meara.
Exhibiting: Air washer, 3500 cfm (plexiglas); complete line of evaporative coolers.

COMMERCIAL FILTERS CORP., 18 W. Third St., Boston 27, Mass.—Booth 218.
In attendance: E. W. Sherburne.
Exhibiting: Filters for heating oils used with both gravity and pressure type oil burners and for bulk filtration of fuel by oil companies, etc.

CONGRESS DRIVES DIV., TANN CORP., 3750 E. Outer Dr., Detroit 34, Mich.—Booth 832.
In attendance: Lee O. Witzenburg, Joseph E. Corbett, William J. Bernhart, John Felter, Edward Tann.
Exhibiting: Variable speed pulleys, V-belts, pulleys, V-belt clutch, and featuring new oil sealed, selt aligning pillow block or bearing (½, ⅝, ¾, and 1 in.).

CONNOR ENGINEERING CORP., W. B., 114 E. 32nd St., New York 16, N. Y.—Booths 119-121.
In attendance: H. A. Baker, J. H. Bartol, T. L. Smith.
Exhibiting: "Kno-Draft" adjustable air diffusers; "Dorex" activated carbon air recovery systems; "Dorex" activated carbon specialties; new "Dorex" food saver.

CONTINENTAL AIR FILTERS, INC., 2520 Helm St., Louisville, Ky.—Booth 211.
In attendance: Wm. K. Gregory, A. S. Lewis, Jr., C. P. Hegan, L. P. Bryant, Elmer T. Gessell, John A. Ray, J. D. Poythress, C. D. Collins.
Exhibiting: Automatic self cleaning air filters; washable unit filters.

COPELAND REFRIGERATION CORP., Sidney, Ohio—Booth 225.

CRANE CO., 836 S. Michigan Ave., Chicago 5, Ill.—Booth 204.

CURTIS REFRIGERATING MACHINE DIV., 1905 Kienlen Ave., St. Louis 20, Mo.—Booth 307.
In attendance: H. C. Morrison, H. J. Nettler, C. L. Angell, N. H. Behrend, W. F. Henke, J. P. Gilbert.
Exhibiting: 2, 3, 5 and 7½ ton self-contained packaged air conditioning units; 5, 20 and 40 hp condensing units; section compressors and condensers. The 2, 3 and vertical 7½ ton packaged air conditioning units and 20, 30 and 40 hp condensing units are new products.

CYCLOTHERM CORP., 157 E. First St., Oswego, N. Y.—Booth 359.
Exhibiting: 80 hp gas fired steam generator.

DAY & NIGHT DIV., AFFILIATED GAS EQUIPMENT INC., Monrovia, Calif.—Booth 360 (see also Southland Supply Co.)

DETROIT LUBRICATOR CO., 5900 Trumbull Ave., Detroit 8, Mich.—Booth 614.
In attendance: K. B. Thorndike, W. D. Knox, J. F. Page, H. L. Walker.
Exhibiting: Heating controls and equipment for gas and oil fired warm air, steam, and hot water heating systems; refrigeration expansion valves and solenoid valves for air conditioning.

DEVICES, INC., 214 E. 53rd St., New York 22, N. Y.—Booth 117.
In attendance: V. L. Yepsen, E. R. Falkenburg.
Exhibiting: "Miracle" surface anchors and adhesives.

DEWEY-SHEPARD BOILER CO., Peru, Ind.—Booth 454.

In attendance: Robert B. Rhoads, George D. Arnold, Herman E. Lundt.

Exhibiting: Gas and oil fired steam and water boilers and water heaters; featuring small home hot water boiler.

DODGE CORP., F. W., 119 W. 40th St., New York 18, N. Y.—Booth 825.

Exhibiting: Publications and services.

DOLE REFRIGERATING CO., 5910 N. Pulaski Rd., Chicago 30, Ill.—Booth 737.

DOLE VALVE CO., 1901-1941 Carroll Ave., Chicago 12, Ill.—Booth 324.

In attendance: John L. Dole, R. M. Ellis, J. Francis Lund, Stuart G. Phillips, H. Aronson, A. Toll.

Exhibiting: Air and vacuum valves, hot water air valves, water mixers, thermostatic air controls for forced warm air systems, flow controls.

DOLLINGER CORP., 11 Centre Park, Rochester 3, N. Y.—Booths 226-228.

In attendance: Lewis L. Dollinger, Jr., C. E. Sweiven, J. V. Fraychinaud, J. P. Asheratt.

Exhibiting: Air, gas and liquid filters.

DOMESTIC ENGINEERING CO., 1801 Prairie Ave., Chicago 16, Ill.—Booth 129.

Exhibiting: Publication.

DOYLE VACUUM CLEANER CO., 225 Stevens St., S. W., Grand Rapids 2, Mich.—Booth 271.

In attendance: Patrick E. Doyle, Harry F. Arnold.

Exhibiting: "Grand Rapids" furnace cleaner for cleaning warm air furnaces, boilers and duct work; furnace and boiler cleaning attachments and chimney cleaning outfit.

DUO-THERM DIV., MOTOR WHEEL CORP., Lansing 3, Mich.—Booth 339.

In attendance: A. Frantz, L. F. Neely, K. Egeler, L. C. Vandertill.

Exhibiting: Oil burning space heaters, gas burning space heaters, gas burning floor furnaces, oil burning water heaters, gas burning water heaters.

DURANT INSULATED PIPE CO., P. O. Box 88, 1015 Runnymede St., East Palo Alto, Calif.—Booth 806.

In attendance: William H. Buck, Patrick W. Neely.

Exhibiting: Samples, cutaways and illustrations of underground insulated pipe conduit.

DWYER MFG. CO., F. W., 317 S. Western Ave., Chicago 12, Ill.—Booth 316.

In attendance: F. W. Dwyer, J. G. Dwyer.

Exhibiting: Draft gages, manometers, CO_2 indicators, pitot tubes, air filter gages, and featuring "Magnehelic" low pressure gages.

FAIRBANKS, MORSE & CO., 600 S. Michigan Ave., Chicago 5, Ill. Booth 104.

FARR CO., 2615 Southwest Dr., Los Angeles 43, Calif.—Booth 111.

In attendance: R. S. Farr, M. S. Farr, W. H. Welty, F. X. Shea.

Exhibiting: "Far Air" self-washing filter, panel filter, rotary cooler.

FASCO INDUSTRIES, INC., 255 N. Union St., Rochester 2, N. Y.—Booths 326-328.

In attendance: H. M. Sylvester, D. R. Schroedel, C. A. Button.

Exhibiting: Shaded pole motors and blowers, and featuring new six pole motor rated from 1/30 to ⅛ hp.

FEDDERS-QUIGAN CORP., Buffalo 7, N. Y.—Booth 719.

FORNEY ENGINEERING CO., 2705 Hawes Ave., Dallas 9, Tex.—Booth 632.

In attendance: R. H. Forney, Carl M. Tribble, Charles R. Walters, Ross Forney.

Exhibiting: Gas burners for commercial heating boilers, package controls and safety devices.

FRICK CO., Waynesboro, Pa.—Booth 355.

In attendance: P. H. Buch, W. O. Kline, C. C. Smith, J. C. Rust, A. E. Roebke, L. C. Nettleship, George M. Basore.

Exhibiting: Cutaway four cylinder new "Eclipse" compressor with a special slow speed drive; six cylinder complete new "Eclipse" compressor.

FRIGIDAIRE DIV., GENERAL MOTORS CORP., 300 Taylor St., Dayton 1, Ohio—Booth 133.

In attendance: C. F. Wood, Earl Boyer, P. B. Beemsterboer, R. I. McKenzie, D. P. Dukeminier, H. E. Martin, R. Q. Bachman, J. R. Remick.

Exhibiting: ½ and 1 hp window type room air conditioners; remote floor type room air conditioner; 3 and 5 hp package store air conditioners; 10 ton package air conditioner; reciprocating compressors ranging in capacity from 1 to 10 hp; "Multipath" cooling units; bottle type water cooler. Exhibit will include illuminated cutaway models, some operating in slow motion, and a special display illustrating summer-winter air conditioning. A cutaway model of an electric dehumidifier will feature the actual removal of moisture from the air.

GANNON CO., RUSSELL R., 700 Dixie Terminal Bldg., Cincinnati 2, Ohio—Booth 423.

In attendance: Russell R. Gannon, Frank Lewis; F. S. Goepper.

Exhibiting: School house heating and ventilating units, both corridor and under-the-window types.

GENERAL CONTROLS CO., 801 Allen Ave., Glendale 1, Calif.—Booths 264-266 (see also Southland Supply Co.)

In attendance: J. F. Ray, W. A. Ray, A. W. Ray, W. L. Kell, Fred Weldon, D. S. Bentley, W. M. Lewis, H. C. Lindstrom, W. R. Nason, A. E. Hess, R. L. Farmer, R. C. Allen, W. E. Conkright.

Exhibiting: Automatic controls for heating, cooling, and air conditioning.

GENERAL ELECTRIC CO., AIR CONDITIONING DEPT., 5 Lawrence St., Bloomfield, N. J.—Booths 636-640.

Exhibiting: Remote and self contained air conditioning; automatic heating.

GENERAL FILTERS, INC., 12890 Westwood Ave., Detroit 23, Mich.—Booth 426.

In attendance: Arthur D. Redner, Mrs. Grace Redner, Robert G. Gregory, Roland A. Redner.

Exhibiting: Three models of fuel oil filters.

GENERAL MOTORS CORP.—see FRIGIDAIRE DIV.

GLASFLOSS CORP., 155 E. 44th St., New York 17, N. Y.—Booth 830.

In attendance: R. R. Pryor, T. R. Simkins, R. P. Anderson.

Exhibiting: "Glasfloss" air filters and pipe wrap. New refill type glass fiber air filter, the frame for which is used over and over again, will be featured.

GOLD TOP HEATING, INC., 1400 E. Second St., Butte, Mont.—Booth 732.

In attendance: T. J. Sullivan; E. J. Mueller, M. K. Gordon, Jr., W. R. Piatt.

Exhibiting: "Truliradiant" gas burner; "Demandtrol" gas valve; positive distribution fitting; draft governors; and featuring completely packaged steel hot water boiler for residential use, fully convertible from oil to gas firing, and vice-versa.

GOODFELLOW CO. INC., E. D., 346 N. Front at Jackson, Memphis 3, Tenn.—Booth 421.

In attendance: Frank Conaway, R. D. Elgin, E. D. Goodfellow.

Exhibiting: Induced draft cooling towers.

GOVERNAIR CORP., 513 N. Blackwelder, Oklahoma City 1, Okla.—Booth 408.

In attendance: Harold Feldstein, Wm. H. Hollingsworth, Wm. H. Moler, Russ S. Oakleaf, W. A. Quinn, A. M. Keyser.

Exhibiting: Blast coils for heating and cooling; fan and coil cabinet; evaporative condenser; self contained air conditioner.

GREENLEE TOOL CO., 2136 12th St., Rockford, Ill.—Booth 231.

In attendance: Ray J. Samuelson, A. H. Hawkinson, Tom Steele, Rob El Cox.

Exhibiting: Hand and power driven hydraulic pipe and conduit benders; hand and hydraulic knockout punches; hand and power driven hydraulic pipe pushers; pipe sets of tools for boring holes; auger bits; car bits; chisels; gouges; and draw knives. No. 785-BE pipe and rigid conduit bender for bending 5 in. and smaller in an automatic controlled machine will be shown for first time as will No. 767 hand operated portable lightweight hydraulic pump for operating knockout punches in size ¾ in. to 4 in.

GUSTIN-BACON MFG. CO., 1412 W. 12th, Kansas City 7, Mo.—Booth 252.

In attendance: P. O. Craig, J. O. Brelsford, J. B. Weltmer, G. C. Jordan, G. R. Miller.

Exhibiting: "Ultralite" insulations.

HEATING, PIPING & AIR CONDITIONING, 6 N. Michigan Ave., Chicago 2, Ill.—Booth 315.

In attendance: F. P. Keeney, Chas. E. Price, W. J. Osborn, C. M. Burnam, Jr., G. C. Cutler, J. D. Thomas.

Exhibiting: Heating, Piping & Air Conditioning magazine; market information.

HEATING & VENTILATING, 148 Lafayette St., New York 13, N. Y.—Booth 217.

Exhibiting: Publication.

HOLLY MFG. CO., 875 S. Arroyo Pkwy., Pasadena 2, Calif.—Booths 221-223.

In attendance: Fred C. Farmer, Sam Quincy, J. Stanley Johnson, Roger Laubach.

Exhibiting: "Stubby" floor furnaces, new "NarroWall" vented wall heaters.

HUNTER FAN & VENTILATING CO., 400 S. Front St., Memphis 2, Tenn.—Booth 811.

In attendance: Tom Jones, Parker T. Finch, George B. Richmond, Milton A. Dreyfus.

Exhibiting: Package attic fans, window fan, belt driven fans, exhaust fan, "Airspread" fans, oscillating fans, floor fans.

ILLINOIS TESTING LABORATORIES, INC., 420 N. La Salle St., Chicago 10, Ill. Booth 232.

In attendance: W. J. Bailey, M. J. Rauscher, R. L. Tate, J. C. Roe.

Exhibiting: Temperature and air velocity measuring instruments, and featuring new pyrometer for radiant heating applications.

IMPERIAL BRASS MFG. CO., 1200 W. Harrison St., Chicago 7, Ill.—Booths 812-814.

In attendance: C. H. Benson, Harry Pearson, Milton Copeland.

Exhibiting: Tube working tools; oil burner fittings, valves and tools; refrigeration and air conditioning parts and service tools; LP gas fittings, valves and tools; plumbing specialties. "Rol-Air" flaring tool, special "Hi-Duty" tube fittings and gear type tube benders will be featured.

INGERSOLL-RAND CO., 11 Broadway, New York 4, N. Y.—Booth 715.

Exhibiting: Pumps, compressors, air and electric tools.

INTERNATIONAL MFG. CO., 600 E. Grand, Oklahoma City, Okla.—Booth 603.

In attendance: James D. Harden, John W. Schultz.

Exhibiting: One ton remote type refrigerated air conditioning unit, walnut grained console type cabinet; ¾ ton remote type refrigerated air conditioning unit, closet model, both of which may be operated either with "Freon" or with chilled and hot water.

INTERNATIONAL METAL PRODUCTS CO., 500 S. 15th St., Phoenix, Ariz.—Booths 613-615-617.

In attendance: A. L. Oxley.

Exhibiting: "Arctic Circle" and "Imperial" evaporative air coolers.

INTERNATIONAL SALES CO., 2045 Evans Ave., San Francisco 24, Calif.—Booth 330.

In attendance: Robert G. Tuck, James F. Deane.

Exhibiting: Warm air furnaces: Closet model—forced air. Unit 14 in. wide and 28 in. deep will be featured.

IRON FIREMAN MFG. CORP., 3170 W. 106th St., Cleveland 11, Ohio—Booths 319-321-323.

JEFFERSON ELECTRIC CO., Bellwood, Ill.—Booth 222.

In attendance: C. T. Harnett, J. R. Bailey.

Exhibiting: Oil burner ignition transformers.

JENKINS BROS., 80 White St., New York 13, N. Y.—Booth 108.

In attendance: C. W. Norton, K. H. Gape, Jack Berly, Tom Deupree, A. M. Street.

Exhibiting: Bronze, iron and steel valves in globe, gate, check, angle and "Y" patterns. A scale model of a piping system will be on display to show actual valve installation.

JOHNSON SERVICE CO., 507 E. Michigan St., Milwaukee 2, Wis.—Booth 601.

In attendance: M. M. Herrick, H. V. Alexander, J. P. Grizzard, C. J. Selasky.

Exhibiting: Automatic temperature and humidity control equipment, in actual operation, for heating, cooling, ventilating, air conditioning and industrial processing. There will also be miniature models of various types of heating, ventilating and air conditioning systems with proper control hookups shown. New electronic control apparatus will be included.

JOY MFG. CO., Oliver Bldg., Pittsburgh 22, Pa.—Booth 113.

In attendance: R. Mancha, R. A. Heindel, C. L. Tinker.

Exhibiting: "Axivane" fans for industrial, commercial, aircraft and home ventilation.

KEENEY PUBLISHING CO., 6 N. Michigan Ave., Chicago 2, Ill.—Booth 315.

In attendance: F. P. Keeney, Chas. E. Price, W. J. Osborn, C. M. Burnam, Jr., G. C. Cutler, J. D. Thomas.

Exhibiting: Heating, Piping & Air Conditioning magazine; American Artisan magazine; market information.

KENDALL CO.—see POLYKEN INDUSTRIAL TAPE DEPT.

KENNARD CORP., 1819 S. Hanley Rd., St. Louis 17, Mo.—Booth 841.

In attendance: Sam M. Kennard, III, A. G. Loeffel, Ben M. McDougall, Frank M. Lebman, Wm. Steinkamp.

Exhibiting: Blast finned coils, air conditioning blower unit, evaporative condensers, cooling towers. New products include "Pancake" unit, a ceiling type air conditioning unit for apartments, hotels and offices with a very shallow depth for application with limited head room.

KEWANEE BOILER CORP., Kewanee, Ill.—Booth 407.

In attendance: J. M. Hartman, W. E. Lewis, Elmer T. Gessell, John A. Ray, J. Doug Poythress, C. Doug Collins.

Exhibiting: "Type C" welded boiler for low pressure steam heating; "Square-Heat Type R" unjacketed boiler; "Bubbling" boiler in gas fired operation to demonstrate generation of steam through illuminated observation ports; "Scottie Jr." boiler, a portable 9 hp unit for power and process steam.

KOHLER CO.—see SOUTHLAND SUPPLY CO., INC.

KRITZER RADIANT COILS, INC., 2901 W. Lawrence Ave., Chicago 25, Ill.—Booth 107.

In attendance: M. W. Knight, C. Newton, C. Johnson.

Exhibiting: Radiant heating coils; new baseboard radiation; commercial "Fin Pipe" heating coils for industrial, institution, apartment buildings, mercantile, railroad, maritime, etc. Cutaway ceiling and wall will show radiant coils installed.

LEWIN-MATHES CO., 1111 Chouteau Ave., St. Louis 2, Mo.—Booths 417-419.

LEWIS & CO., W. E., 610 Thomas Bldg., Dallas 1, Tex.—Booth 215.

In attendance: R. W. Cumming, G. B. Burke, J. A. Ray, E. Gessell.

Exhibiting: "Sarco" steam specialties for industrial plants, medium and high pressure steam heating systems. New "Sarcotherm" weather control system for hot water and radiant heating in residences, apartments, housing projects, hospitals, and large industrial and institutional buildings, will be featured.

LIBBEY-OWENS-FORD GLASS CO., Nicholas Bldg., Toledo 3, Ohio—Booth 434.

In attendance: J. C. Mackenzie, H. A. Schofield, R. B. Davis, C. E. Shepperly, Glenn T. Dunn, Jr., John L. Cox.

Exhibiting: "Thermopane" insulating glass, "L-O-F" heat absorbing plate glass, "Golden" plate glass (fade reducing). Changing panoramic views of Texas landscapes viewed through picture window, and scale models of food and apparel shops showing functional use of heat absorbing and fade reducing glass, will be featured.

LILIE-HOFFMANN COOLING TOWERS, INC., 4239 Duncan Ave., St. Louis 10, Mo.—Booth 834.

In attendance: Paul R. Hoffmann, F. W. Rabe, Ray Guyer.

Exhibiting: Scale model induced draft cooling tower and an atmospheric tower.

LIMA REGISTER CO., 651 N. Baxter St., Lima, Ohio—Booth 227.

LITTLE GIANT VAPORIZER CO., INC., 5101 Classen Blvd., Oklahoma City 6, Okla.—Booth 125.

In attendance: P. C. Depew, John E. Mitchell, J. Claude Whittle.

Exhibiting: Vaporizers, pumps, controlled humidity units, condensate removal pumps.

LOCKFORMER CO., 4615 W. Roosevelt Rd., Chicago 50, Ill. Booth 317.

In attendance: George W. Lamberson, Harold G. Flagler, Edward C. Bill, John Davis.

Exhibiting: "Lockformer" No. 24 with power flanging attachment; "Lockformer" No. 20; "Cleatformer"; Easy Edger."

LONE STAR GAS CO., 301 S. Harwood St., Dallas 1, Tex.—Booth 472.

MARLEY CO. INC., Fairfax & Marley Rds., Kansas City 15, Kans.—Booth 410.

In attendance: Roy W. Maze, Lyle A. Christensen, Robert McFadin, Leon T. Mart, Elmer Gessell, Walter Smith, Joe McKinley.

Exhibiting: New 1950 "Aquatower" and "Vairflo" actual cooling towers. "Double Flow" cooling tower model, nozzles.

MARLO COIL CO., 6135 Manchester Ave., St. Louis 10, Mo.—Booths 605-607.

In attendance: L. C. Pellegrini, C. D. Marlo, F. G. Meyers, F. E. Ince, G. E. Roepke, H. R. Iverson, W. B. Moses, Jr.

Exhibiting: Evaporative condensers and cooling towers equipped with "Lektrotector"; floor type air conditioner; spray type dehumidifier; blast coils for cooling and heating; unit air conditioners. A new non-ferrous dehumidifier, evaporative condensers, cooling towers equipped with "Lektrotector", and remote type room conditioners will be featured.

McDONNELL & MILLER, INC., Wrigley Bldg., 400 N. Michigan Ave., Chicago 11, Ill.—Booth 230.

In attendance: E. N. McDonnell, Nils W. Swanson, Leo J. Kmiecik, W. E. Gleeson, George La Roi, Phil Ashcraft, E. G. Langhammer, A. J. Rummel.

Exhibiting: Boiler water level controls, safety relief valves, humidifier water level controls, and related equipment, and featuring new safety relief valve, new low water cutoff for hot water boilers, new water column type low water cutoff for gas fired boilers.

MID-CONTINENT METAL PRODUCTS CO., 1960 Clybourn Ave., Chicago 14, Ill.—Booths 468-470.

In attendance: A. F. Zitzewitz, E. J. Haedike, C. F. Petersen.

Exhibiting "Lo-Blast Economite" power type residential gas conversion burner equipment and standard line of "Lo-Blast" burners, featuring equipment used in firing larger commercial and industrial boilers.

MIDWEST AUTOMATIC CONTROL CO., Subsidiary of Midwest Air Control, 510 Third St., Des Moines 9, Ia.—Booth 643.

In attendance: Perry T. Crane, Harry R. Frankle, Mrs. Harry R. Frankle, Mrs. Belva Scoles, Felix M. Roth.

Exhibiting: "Magic Dial" basic automatic control system for heating, cooling or combination, which is operated by single master switch; "Magic Wire" numerically coded wire, with terminals numbered to correspond with numerals on wire to reduce installation costs and trouble-shooting.

MILWAUKEE GAS SPECIALTY CO., 730 N. Jackson St., P. O. Box 461, Milwaukeee 1, Wis.—Booths 456-458.

MINNEAPOLIS-HONEYWELL REGULATOR CO., 2747 Fourth Ave. S., Minneapolis 8, Minn.—Booths 744-745 (see also Southland Supply Co.)

In attendance: J. E. Haines, A. H. Lockrae, C. D. Lyford, J. S. Locke, V. D. Wissmiller, R. H. Jacobs, B. C. Benson, K. L. Wilson, K. W. Schick, H. C. Carlson, J. R. Bergan, J. A. Young, W. J. Baak, H. E. Chapler, Ralph Mixon, T. S. Carley, Fred Brandt, Richard Williamson, Chas. A. Walker, Chas C. Grimes, Harry L. Mayes, Curtis Zahn, Z. A. Marsh, J. F. Cummiskey, H. L. Canoyer, L. B. Belford, T. McDonald.

Exhibiting: Automatic controls for heating, ventilating, air conditioning, and featuring electronic air conditioning control system, electronic "Cyclotrol," pneumatic automatic reset control, self-powered gas control system, new diaphragm gas valve, flexible element combination control, new "Sem-automatic" time switch, new unit heater thermostat with special sub-base.

MITCHELL MFG. CO., 2525 Clybourn Ave., Chicago 14, Ill.—Booth 629.

MORSE-SMITH-MORSE INC., 165 Dexter Ave., Watertown 72, Mass.—Booth 128.

Exhibiting: Fusible oil valves for use in kitchen ranges, space heaters and floor furnaces; oil filters; thermal switches; level valves; tank gages; vent caps.

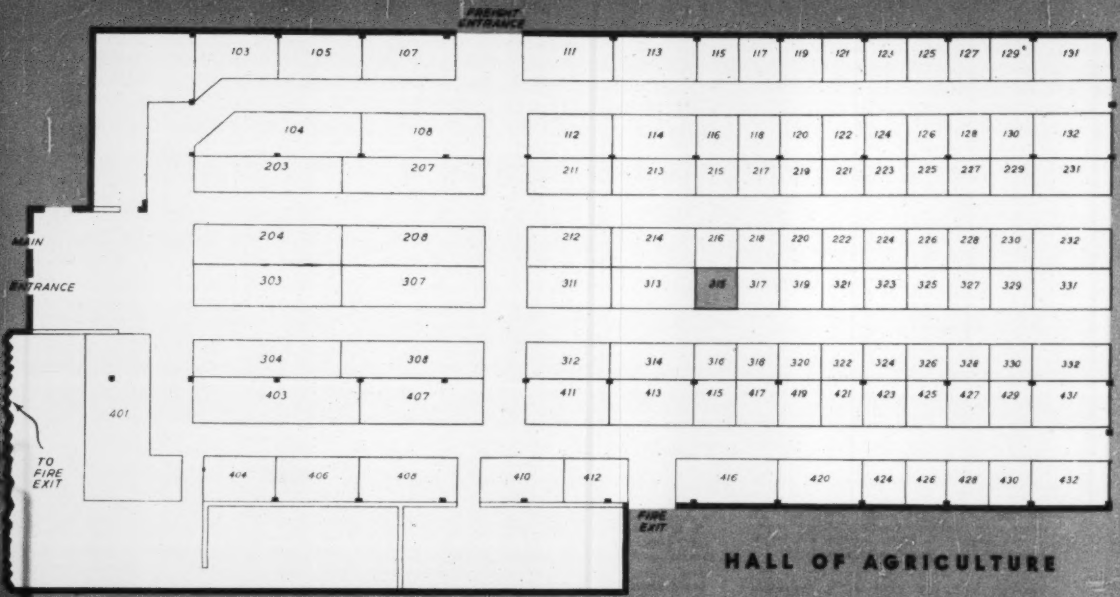
MOTOR WHEEL CORP.—see DUO-THERM DIV.

MUELLER FURNACE CO., L. J., 2005 W. Oklahoma Ave., Milwaukee 7, Wis.—Booths 304-308.

In attendance: H. P. Mueller, C. L. Hewitt, Jr., F. J. Nunlist, L. M. Becknell, J. H. Reock.

Exhibiting: Complete line of gas, oil and coal heating and air conditioning equipment, and featuring a number of new products.

MULTI-VENT DIV.—see PYLE NATIONAL CO.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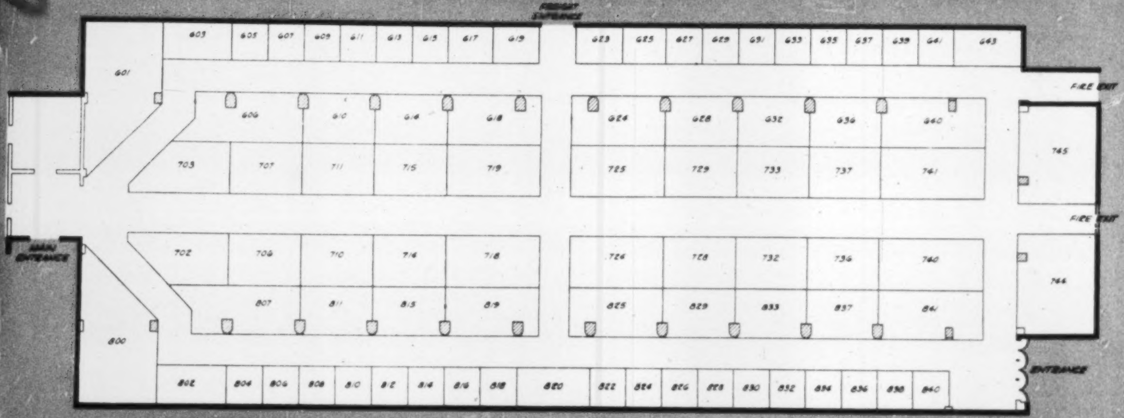
HALL OF AGRICULTURE

Booth Layout for Exposition at State Fair Park, Dallas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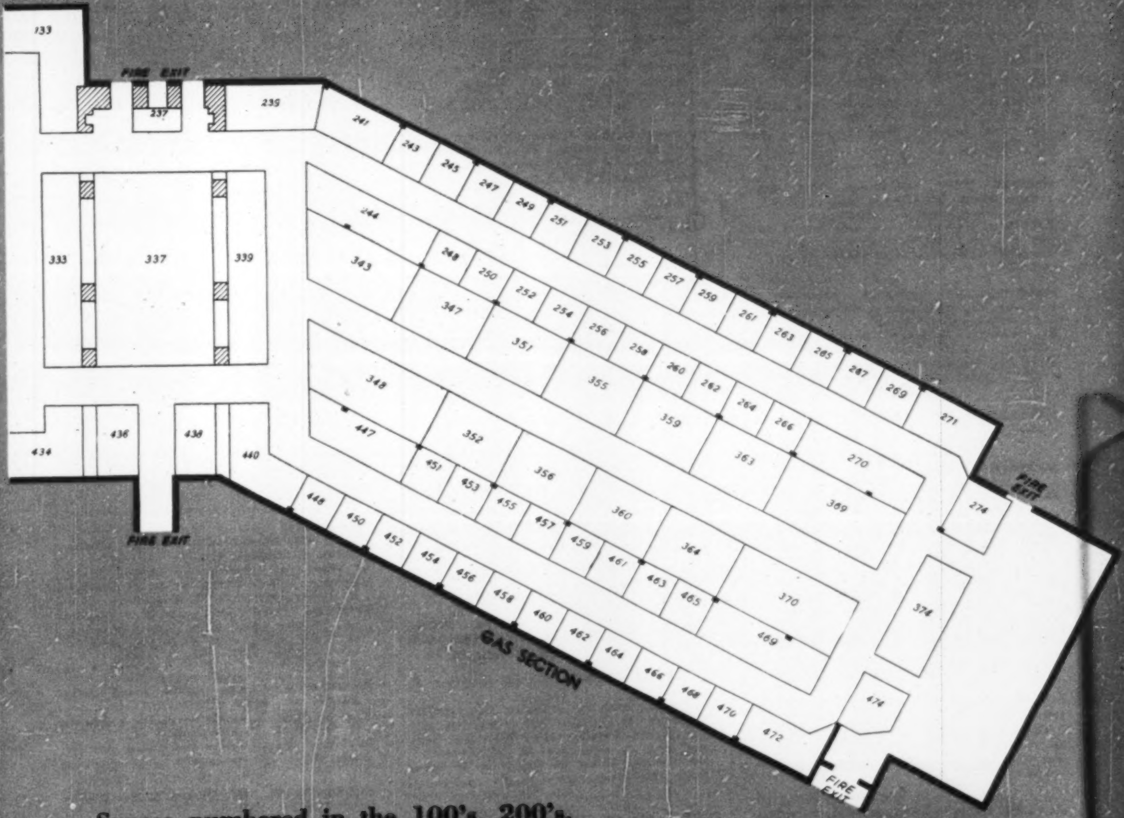
POULTRY BUILDING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GAS SECTION
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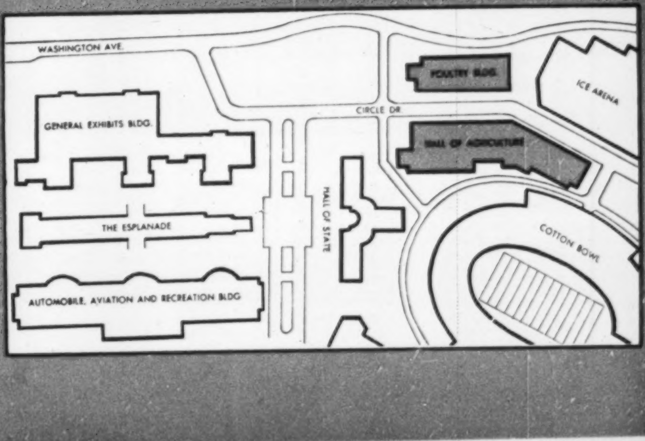
Spaces numbered in the 100's, 200's, 300's and 400's are in the Hall of Agriculture and spaces in the 600, 700 and 800 series are in the Poultry Building. Keeney Publishing Co., publisher of Heating, Piping & Air Conditioning and American Artisan, is in Booth No. 315

Location of the two exhibit buildings, the Hall of Agriculture and the Poultry Building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CIRCLE DR.
GENERAL EXHIBITS BLDG.
HALL OF AGRICULTURE
HALL OF STATE
THE ESPLANADE
COTTON BOWL
AUTOMOBILE, AVIATION AND RECREATION BLDG.

MUNDET CORK CORP. (INSULATION DIV.), 7101 Tonnelle Ave., North Bergen, N. J.—Booths 245-247-249.

In attendance: H. H. Bruns, Samuel Garre, Jr., Leon Choate, A. A. Stone, B. Botter, J. J. Steiger, O. Shepard, B. Graff, S. J. Shilcutt, E. J. Stansbury, C. Vass, G. M. Roland, A. J. Essery.

Exhibiting: Corkboard low temperature insulation and "Jointite" cork pipe covering, and featuring magnesia high temperature pipe covering.

NELSON CORP., HERMAN, 1824 Third Ave., Moline, Ill.—Booth 440.

In attendance: Charles S. Stock.

Exhibiting: Unit ventilators, unit heaters, propeller fans, unit blowers, centrifugal fans, portable heaters and ventilators.

NESBITT, INC., JOHN J., State Rd. & Rhawn St., Holmesburg, Philadelphia 36, Pa.—Booth 633.

In attendance: Michael J. Murray, Albert J. Nesbitt.

Exhibiting: "Syncretizer" schoolhouse unit ventilator; water coils.

NIAGARA BLOWER CO., 405 Lexington Ave., New York 17, N. Y.—Booth 741.

NORMAN PRODUCTS CO., 1150 Chesapeake Ave., Columbus 12, Ohio—Booths 404-406.

In attendance: D. D. Piper, E. A. Norman, Jr., R. G. Dawley, L. E. Minns, C. H. Wolfer, Claude S. Slocum, N. M. Reisdorph.

Exhibiting: "Southerner" horizontal gas furnace, "Master" gas conversion burner, "Deluxe" gas conversion burner, "Twinfuel" conversion burner, "Twinfuel" furnace, gas designed furnace.

OHIO FOUNDRY & MFG. CO., Slack St., Steubenville, Ohio—Booths 464-466.

Exhibiting: Gas fired room heaters, new evaporative cooler.

ORAN CO., 2232 S. Third St., Columbus 7, Ohio—Booth 248.

In attendance: H. W. Kelly, J. E. Ledger.

Exhibiting: New gas fired floor furnace, oil fired floor furnace.

OUTSIDE VENETIAN BLIND CO., 2625 Elm St., Dallas 1, Tex.—Booths 710-714-718.

In attendance: Colin Jones, Paul Miller, James Venable, Roland Bandy.

Exhibiting: "Clearview" outside venetian blinds and venetian windows, for reducing air conditioning tonnage requirements.

OWENS-CORNING FIBERGLAS CORP., 1833 Nicholas Bldg. Toledo 1, Ohio—Booths 112-114.

In attendance: C. L. Rowley, John Dowd, J. L. Neal, L. L. Frost, Jr., M. W. Butler.

Exhibiting: Improved air filters, duct insulation, filtration products, boiler insulation.

PACIFIC STEEL BOILER DIV., U. S. RADIATOR CORP., 300 Buhl Bldg. Detroit 26, Mich. Booths 130-132.

In attendance: H. B. Steggall, E. J. Grady, R. F. Hackett, Robert Boose, J. R. Dowdell, N. R. Collins, D. L. Moody, T. R. Frymire, Al Leonard, Grover Worley, Jerry Hays, Joe Merrill, Lee Adams, W. D. Johnson, S. T. Lake, Joe Powell, Ed Gravens, C. S. Dershimer, Hugh McMillan.

Exhibiting: Steel boilers and induced draft fan, and featuring action display of split firebox boiler.

PALMER MFG. CORP., 2200 W. Fillmore, Phoenix, Ariz.—Booth 702.

In attendance: Leetate D. Smith, Paul McAdams, Sam Keeble.

Exhibiting: Evaporative air coolers, gas fired heating equipment, new window exhaust fans.

PATTERSON-KELLEY CO. INC., East Stroudsburg, Pa.—Booths 838-840.

PAYNE FURNACE DIV., AFFILIATED GAS EQUIPMENT, INC., 801 Royal Oaks Ave., Monrovia, Calif.—Booth 343.

In attendance: Art J. Horn, Bert P. Fisher, Harry W. Presseur.

Exhibiting: Console, floor furnace, "Panelair", "Sentry," "Space Saver," "Zone air," "CB" commercial heater.

PENNSYLVANIA FURNACE & IRON CO., 316 Pine St., Warren, Pa.—Booth 356.

In attendance: R. L. Blodgett, Howard R. Lauffenburger, C. S. Andersen, H. J. Harvey, Roy Hanson.

Exhibiting: Gas fired gravity and forced air furnaces; gas fired water and steam sectional boilers for both domestic and commercial uses.

PITTSBURGH CORNING CORP., 307 Fourth Ave., Pittsburgh 22, Pa.—Booth 127.

In attendance: Robert F. Benda, Robert F. Quinn.

Exhibiting: "PC" glass blocks and "Foamglas" insulation. By use of installation photographs and product samples, display will emphasize advantages of glass blocks and insulation for increasing efficiency of air conditioning systems.

PLUMBING & HEATING JOURNAL, 45 W. 45th St., New York 19, N. Y.—Booth 430.

Exhibiting: Publication.

POLAIRE COOLER CO., 141 E. Jackson St., Phoenix, Ariz.—Booth 610.

In attendance: R. E. Walklin, E. H. Osburn, A. E. Cornwall.

Exhibiting: Evaporative cooler with revolving pad, and component parts.

POLYKEN INDUSTRIAL TAPE DEPT., BAUER & BLACK, DIV. OF KENDALL CO., 222 W. Adams St., Chicago 6, Ill.—Booths 116-118.

In attendance: William J. Miller, Ernest E. Dickinson.

Exhibiting: Industrial adhesive tape product adaptable to heating and ventilating industry, and featuring new "Fiberglas" flexible duct connector and a "revolutionary" material for sealing gravity warm air pipes, ducts, insulation, etc.

POPELL CO. OF TEXAS, L. F., 1716 Laws St., Dallas 2, Tex.—Booth 263.

POWERS REGULATOR CO., 2720 Greenview Ave., Chicago 47, Ill.—Booths 833-837.

In attendance: Jos. W. Powers, Kenneth M. Stevens, R. G. Lyford, C. C. Quin, J. R. Patten.

Exhibiting: Thermostats, hygrostats, diaphragm valves, damper motors, dial thermometers, steam regulators, recording thermometers, recording regulators. New diaphragm valves for radiators and coils and improved products for other applications will be featured.

PRAT-DANIEL CORP.—see THERMOBLOC DIV.

PYLE NATIONAL CO., MULTI-VENT DIV., 1373 N. Kostner Ave., Chicago 51, Ill.—Booth 432.

In attendance: D. L. Packard, George K. Raider, R. B. Black, J. P. Ashcraft, J. P. Maguire, Thomas E. Price.

Exhibiting: "Multi-Vent" panels for low velocity air diffusion "for draft-free and uniform heating, ventilating, and air conditioning." A working demonstration model, showing the operation and effect of low velocity air distribution, and new sizes of equipment will be featured.

QUIET HEET MFG. CORP., 135 N. J. Railroad Ave., Newark 5, N. J.—Booth 816.

In attendance: E. M. Peters, S. L. Sloan.

Exhibiting: "Quiet Kool" ½ hp and ¾ hp room air conditioners; "Quiet Heet" domestic oil burners and gas burners; "Quiet Breeze" exhaust fan; "Quiet Dri" dehumidifier.

RADIANT UTILITIES CORP., 8805 18th Ave., Brooklyn 14, N. Y.—Booth 427.

In attendance: Jacob G. Goldberg, Julius S. Goldberg, Arthur A. Marcus, Joseph Bloom.

Exhibiting: "Radiant" oil burners, and featuring new sliding adjustable flange burner.

RALPH SUPPLY, INC., P. O. Box 188, Wadsworth, Ohio—Booth 611.

In attendance: Ralph T. Jenkins, Raymond G. Jenkins, Willard Ralph, F. R. Stumpf.

Exhibiting: Metal flues for gas and oil fired equipment; furnace fittings; registers; draft hoods.

RANDALL GRAPHITE BEARINGS, INC., 609 W. Lake St., Chicago 6, Ill.—Booth 219.

In attendance: M. E. Clark, W. E. Dickerson, E. C. Smith, Alan Dale.

Exhibiting: Self aligning pillow blocks, graphited bronze bearings, phosphor bronze bearings, cored and solid bronze barstock. New standard stock bronze bushings and cored and solid bronze bars will be featured.

RAY OIL BURNER CO., 401-499 Bernal Ave., San Francisco 12, Calif.—Booth 332.

In attendance: Russell C. Westover, Jr., George A. Martin, Carl J. Draper, Raymond B. Plass, Rudolph A. Rothe.

Exhibiting: Domestic oil burner (pressure type), combination gas oil burner (pressure type), combination gas oil burner (rotary type). The size 10 fully automatic rotary oil burner and a fully automatic rotary type combination gas-oil burner will be featured.

RCS TOOL SALES CORP., 25 N. Ottawa, Joliet, Ill.—Booth 829.

In attendance: Francis S. Russell, T. M. Sweeney, Dale D. Davis, Carl R. Longanecker, R. L. Stephenson, A. K. Stephenson.

Exhibiting: "Super-Saw", portable all purpose, and "Korner-King," right angle drill attachment, for roofing, warm air heating, electrical insulation, and other types of work.

READY-POWER CO., 11231 Freud Ave., Detroit 14, Mich.—Booth 363.

In attendance: H. D. Gumpper, W. S. Jewell, W. Wendt, J. C. Allingham.

Exhibiting: Engine-driven compressor unit for natural gas, 35 ton capacity.

REDMOND CO., INC., Owosso, Mich.—Booths 124-126.

REFRIGERATION APPLIANCES, INC., 923 W. Lake St., Chicago 7, Ill. Booth 628.

In attendance: E. Niederer, Hugh D. Smart.

Exhibiting: Remote type central station air conditioning unit; remote type spot comfort cooler, ceiling suspended model; evaporative condenser. "Breez-E-Fex" remote type console model comfort cooler for multiple installations for hotels, tourist cabins, etc., for direct expansion coil or chilled water, will be featured.

REFRIGERATION ENGINEERING, INC. 7250 E. Slauson Ave., Los Angeles 22, Calif.—Booths 635-637-639-641.

In attendance: Harry Quinn, Dan D. Wile, Hy Jarvis.

Exhibiting: Air conditioning coil, vertical air conditioner, horizontal air conditioner, "Dri-Fan" cooling tower, "Dri-Fan" evaporative condenser, "Supreme" coil, water defrost coil.

REMINGTON AIR CONDITIONING, DIV. OF REMINGTON CORP., Cortland, N. Y.—Booth 265.

In attendance: Herbert L. Laube, E. A. Bonneville.

Exhibiting: Complete line of single room air conditioners, window models and consoles for a-c and d-c both air and water cooled, including new four-season models that heat as well as cool.

RESEARCH PRODUCTS CORP., 1015 E. Washington Ave., Madison 10, Wis.—Booth 438.

In attendance: C. B. Rowe, A. W. Brown, J. G. Schutz, J. P. Ashcraft, Les Tye.

Exhibiting: Replacement air filters, washable air filters, grease filters, holding frames, etc.

REYNOLDS METALS CO., 2500 S. Third St., Louisville 1, Ky.—Booths 214-216.
In attendance: Stuart Smith, H. N. Logsdon, D. L. Russell, O. N. Ashcraft, R. A. Castillo, L. E. Pennington, H. V. Menking, Geo. Perkins, R. W. Smith, H. D. Jones, D. F. Beard, R. W. Christensen.
Exhibiting: Aluminum air duct sections, diffusers, grilles, vents, vent hoods, dust collectors, furnace casings, heating and cooling coils, etc., fabricated in plain and embossed patterns.

RIC-WIL CO., 1052 Union Commerce Bldg., Cleveland 14, Ohio—Booth 403.
In attendance: M. A. Hanna, C. W. Wheeler, W. L. Bartel, E. A. Wert, H. W. Roskilly, E. S. Pandy.
Exhibiting: Prefabricated insulated piping for underground or overhead installation for all heating, cooling and power requirements, distribution of steam, hot or cold water, oil, process liquids, etc. Exhibit will feature over 100 ft of insulated piping to meet all requirements of heating and air conditioning: 1) "Hel-cor" insulated pipe units, 2) cast iron insulated pipe units, 3) "Foilclad" insulated pipe units for overhead lines.

RIDGE TOOL CO., 400 Clark St., Elyria, Ohio—Booths 448-450-452.
In attendance: R. C. Chamberlin, L. C. Richardson, R. D. Fye, W. L. Parcell.
Exhibiting: Pipe tools.

ROBERTSON CO., H. H., 2400 Farmers Bank Bldg., Pittsburgh 22, Pa.—Booths 120-122.
In attendance: Joseph J. Siddall, Harry H. Roberts, John E. Thoma, C. A. Pickett.
Exhibiting: Insulated exterior wall panels; ventilators; "Galbestos" roofing and siding.

ROYAL HEATERS, INC., 1024 Westminster Ave., Alhambra, Calif.—Booth 836.
In attendance: R. T. Lowrie, N. M. Landaiche, Lloyd Cody, Russell Smith, Atwood L. Fuller.
Exhibiting: "Jet Flow" heating unit.

SARCO CO., INC.—see **W. E. LEWIS & CO.**

SCOVILL MFG. CO., P. O. Box 1820, Waterbury 91, Conn.—Booth 808.
In attendance: S. J. Lucas.
Exhibiting: "Uniflare" fittings, which will be displayed in connection with a typical refrigeration unit in full operation to demonstrate the "non-frosting" feature of the fittings, made in both brass and aluminum.

SERVEL, INC., 119 N. Morton Ave., Evansville 20, Ind.—Booth 469.
In attendance: J. A. Gilbreath, H. C. Pierce, Carl F. Schroeder, Carl A. Gruggel, W. J. Hoeing, David E. Young, R. E. Davis, W. K. Grube, D. M. Mayne, K. I. Wallace, Richard K. Graham, James M. Kennedy, E. G. Ploeger, W. F. Wright, Jr., Paul R. Williams, Urban H. Anslinger, T. C. Burdette, Robert C. Marbach.
Exhibiting: "All-Year" air conditioner, featuring absorption type refrigeration unit.

SHEET METAL WORKER, 45 W. 45th St., New York 19, N. Y.—Booth 430.
Exhibiting: Publication.

SIEMON & CO., 3025 Main St., Kansas City 8, Mo.—Booth 241.
In attendance: R. H. Siemon, John Douglass, Chas. D. Jones, L. C. Tucker.
Exhibiting: "Combi-matic" gas and oil burners, and conversion gas burners, the gas-oil burner being designed to permit the addition of the gas burning attachment to any gun type oil burning installation and controlled to automatically change from gas firing to oil firing from outside temperature, or from interruption of gas supply.

SKIDMORE CORP., St. Joseph, Mich.—Booth 351.
In attendance: Vernon F. Radde, Gene Woods, John A. Ray, E. T. Gesell.
Exhibiting: Vacuum and boiler feed pumps; condensate and boiler feed pumps.

SMITH CORP., A. O., Milwaukee, Wis.—Booths 254-262.
In attendance: J. D. Kelly, J. E. Blanco, G. E. Kemper, G. H. Nichols, J. D. Kunz, W. L. Melcher, W. B. Kennemer, D. H. Rude, A. E. Butts, J. H. Brinker, L. M. Keating, J. Dilot, D. R. Neff, J. F. Donnelly, J. W. Long, J. B. Madden, J. P. Parker, M. B. Sawyer, Jr., J. J. Progress, Don Williams, Willard Manthei.
Exhibiting: Electric motors, water heaters, "Burkay" heaters, pumps, LPG tank. "Magic Heet" control will be featured.

SOUTHLAND SUPPLY CO., INC., 2034 Amelia St., Dallas, Tex.—Booth 364.
In attendance: B. V. Henegar, V. C. Kneese, J. M. Henegar, S. E. Knox, R. V. Lentz, E. C. Connor, A. Q. Roberts, C. A. Wagner.
Exhibiting: Products of Day & Night Div., Affiliated Gas Equipment Inc.; Kohler Co.; General Controls Co.; Minneapolis-Honeywell Regulator Co.

STEWART WARNER CORP., SOUTHWIND DIV., 1514 Drover St., Indianapolis, Ind.—Booth 270.
In attendance: W. E. Judd, W. J. Hawkins, H. W. Milner, A. F. H. Scott.
Exhibiting: "South Wind" and "Saf-Aire" heating equipment, featuring 1,000,000 Btu per hr input heater weighing 85 lb.

SUNDSTRAND MACHINE TOOL CO., Rockford, Ill.—Booth 415.
In attendance: C. W. Lang, L. H. Schuette, O. E. Mayfield, H. O. Wahlmark.
Exhibiting: Oil burner fuel units and pumps, featuring two stage and solenoid equipped units.

SURFACE COMBUSTION CORP., 2375 Dorr St., Toledo 1, Ohio—Booths 348-352-447-451-453.
In attendance H. A. Gross, H. T. Gates, C. C. Owen, W. J. Grover, Max Tappero, W. R. Egan, F. S. Hamer, R. B. Thornburgh, R. E. Hollinshead, R. A. Bell, W. M. Adams, L. Surface, L. J. Monahan, L. W. Sutherland, C. B. Phillips, H. C. Gurney, C. H. Langendorf, P. deCoriolis.
Exhibiting: "Janitrol" winter air conditioner, gravity warm air furnace, cast iron hot water and steam boiler, triple service hot water system, unit heater, "Thermo-Attic" heater, duct heater, conversion burner. Duct heater with new "NBS A-19" coated heat exchanger, "non-corrosive and impervious to condensation when used with summer air conditioning duct systems," will be featured.

TAL BENDER, INC., 417 N. Water St., Milwaukee 2, Wis.—Booth 828.
In attendance: E. T. Tal, E. Luprecht, W. R. Parker.
Exhibiting: Mechanical and hydraulic pipe and tube benders, featuring fast new hydraulic portable 4 in. bender and portable tube benders up to 2 in. for hard and soft copper, boiler tubing and any other tubing.

TANN CORP.—see **CONGRESS DRIVES DIV.**

TENNESSEE ENAMEL MFG. CO., 4104 Park Ave., Nashville 9, Tenn.—Booth 243.
In attendance: W. O. Winner, Frank Drake.
Exhibiting: "Temco" gas space heaters and floor furnaces, the furnaces featuring shallow construction (25¼ in. depth), new burner with rustproof ceramic ports, and porcelain enamel heat chamber. Space heaters on exhibit will include a new automatic forced air circulator especially adaptable to basementless homes with concrete slab floor construction and second floor installation.

THERMOBLOC DIV., PRAT-DANIEL CORP., 84 S. Water St., East Port Chester, Conn.—Booth 224.
In attendance: E. M. Tarnoff, F. T. Bobbitt, J. V. Wolfe.
Exhibiting: No. 300 self-contained industrial direct fired industrial heating units, gas and oil fired.

TITUS MFG. CORP., 113 E. Eighth St., Waterloo, Ia.—Booth 318.
In attendance: Donald L. Titus, I. M. Golan.
Exhibiting: Complete line of "Airfoil" air conditioning outlets; outlet incorporating a four-way directional grille and a volume controller, primarily designed for use on systems where the duct work is exposed in the space conditioned, will be featured.

TORRINGTON MFG. CO., 70 Franklin St. Torrington, Conn.—Booth 208.

TRIMONT MFG. CO., DIV. OF AETNA INDUSTRIAL CORP., 55 Amory St., Roxbury 19 (Boston), Mass.—Booth 818.
In attendance: James Ragsdale, Joseph Ballem.
Exhibiting: "Trimo" and "Roxco" heavy duty, and "Popular" Stillson normal duty pipe wrenches, "Trimo" monkey wrenches, pipe vises, pipe and tube cutters, strap wrenches. A moving mechanical man operating new and improved pipe wrench will be featured.

TRION, INC., 1000 Island Ave., McKees Rocks, Pittsburgh, Pa.—Booth 239.

TUTTLE & BAILEY, INC., Corbin Ave., New Britain, Conn.—Booth 311.
In attendance: R. D. Tutt, R. S. Rickabaugh, J. H. Smart, J. R. Dowdell.
Exhibiting: Ceiling diffusers, grilles, registers and air control devices for heating, ventilating and air conditioning installations; copper convectors for steam and hot water systems.

TYPHOON AIR CONDITIONING CO., INC., 794 Union St., Brooklyn 15, N. Y.—Booths 623-625.
In attendance: James F. Dailey, Edward L. Garfield, Don V. Petrone, Murray M. Kabili, Alfred E. Weber, Richard E. Cherry, P. E. Carter, Edward Beck, Peter T. Wotton.
Exhibiting: Free-standing air conditioning units: 3 ton, 7-½ ton, 10 ton, and 20 ton; evaporative condensers: 8 ton and 20 ton; high side: 7-½ ton; water cooled condenser: 5 ton; two row heating coil.

UNITED ELECTRIC SERVICE CO., 1100 Scott Ave., Wichita Falls, Tex.—Booth 425.
In attendance: Sydney A. Gaines, Chas. D. Morrison, Thomas E. Dean.
Exhibiting: "Magic-Aire" evaporative cooling units.

UNITED STATES AIR CONDITIONING CORP., Como Ave. S. E. at 33rd St., Minneapolis 14, Minn.—Booth 819.
In attendance: A. A. Feinberg, L. P. Hanson, D. E. Feinberg, R. M. Dawson, A. G. Pabst, J. D. Higgins, D. R. Groth, M. A. Stuart.
Exhibiting: New 5 ton refrigerated "Kooler-aire" unit, new 5 ton upright store conditioner, 550 cfm "De-Hu-Matic" evaporative cooler, "usAIRco" gas fired unit heater, "Modu-aire" unit, exhauster, new turbo blower, new belted vent set. The evaporative cooler features a valve which automatically regulates evaporation through atmospheric control, "making universal application of evaporative cooling possible and profitable."

UNITED STATES RADIATOR CORP., 300 Buhl Bldg., Detroit 26, Mich.—Booths 429-431 (see also Pacific Boiler Div.)
In attendance: W. J. Peoples, J. R. Knox, A. F. Westerfield, M. L. Judd, T. F. Gessner.
Exhibiting: Boilers, radiators, controls and heating accessories, and featuring radiant baseboard.

UTILITY APPLIANCE CORP., 4851 S. Alameda St., Los Angeles 11, Calif.—Booth 807.
In attendance: Howard M. Canterbury, Bernard Harris, Herb Leo.
Exhibiting: Forced air furnaces, unit heaters, built in circulating wall heaters, evaporative air coolers, all-year conditioner, with guaranteed heating performance.

VERSON MFG. CO., Holmes St. at Ledbetter Dr., P. O. Box 9128, Dallas, Tex.—Booth 618.

In attendance: Leon J. Krysinski, Ralph E. Verson, Lee Roy Long, Harold Verson.

Exhibiting: Metal stamping samples, press brake, miniature mechanical and hydraulic presses, sample forming and draw dies. Displays of transfer feed press items and modern metal fabricating methods will be featured.

VIKING MFG. CORP., 1747 Chester Ave., Cleveland 14, Ohio—Booth 347.

In attendance: H. S. Frasher, P. B. Patton, L. J. Morefield, A. F. H. Scott.

Exhibiting: Packaged air conditioning, window type air conditioner, gas winter air conditioner, gas water heater, "Flatpak" aluminum ductwork, and featuring complete new line of packaged air conditioning, from 3 to 20 hp units, including cooling towers and evaporative condensers.

VULCAN RADIATOR CO., 26 Francis Ave., Hartford 6, Conn.—Booths 320-322.

In attendance: Thomas L. Arnold, John H. Ehn, Richard B. Sweet, Josh Dowdell.

Exhibiting: Extended fin surface, ferrous and non ferrous; baseboard radiation; grille covers for radiation. New "FSF" baseboard cover and new copper radiator with aluminum fins will be featured.

WATERMAN-WATERBURY CO., 1121 Jackson St. N. E., Minneapolis 13, Minn.—Booth 244.

In attendance: H. G. Cross, Paul E. Cross, Ben O. Schwarz, David Sedgwick, Stewart Smith, J. D. White, Everett Borst, Brighton Eddy, Ted Doering, Wm. Morrisey, F. W. Legler, Otto Griefnov, James Bazille, Frank McConnell.

Exhibiting: Winter air conditioning equipment consisting of gas, oil and coal fired furnaces.

WEBSTER ELECTRIC CO., 1900 Clark St., Racine, Wis.—Booth 229.

In attendance: Louis Ehrich, Ben Wiechers, D. J. Monroe, W. E. Dent, P. G. Crewe.

Exhibiting: Fuel units, ignition transformers, and "Thermodrive" forced warm air control, the latter being a comparatively new item that ties in particularly well with the current interest in C.A.C. (controlled air circulation).

WEBSTER ENGINEERING CO., 419 W. Second St., P. O. Box 2168, Tulsa 1, Okla.—Booths 455-457.

In attendance: G. C. Bergtholdt, H. A. Macfarline, J. C. Wallis, W. D. Charles, L. S. Reagan.

Exhibiting: Gas burners, electronic combustion safeguard system, automatic combustion controls. "Dynetic" forced draft conversion burners for high capacities with minimum size and lower gas pressure will be shown in public for first time.

WEIL-McLAIN CO., Michigan City, Ind. Booth 250.

In attendance: W. R. Stockwell, E. R. Westphal, R. M. Stockwell, N. E. Westphal, R. A. Kuntz.

Exhibiting: Gas boiler, oil heating unit, "Solray" radiation, "Raydiant" radiation.

WESTINGHOUSE ELECTRIC CORP., 511 Wood St., P. O. Box 868, Pittsburgh 30, Pa.—Booth 725.

WHITE-RODGERS ELECTRIC CO., 1209 Cass Ave., St. Louis 6, Mo.—Booth 606.

In attendance: J. A. Rodgers, Jack Searls, E. C. Robinson, D. O. Eggert, Jack Barnes, A. Keane, J. Borah, Louis Close, H. Teasley.

Exhibiting: Controls for heating and air conditioning.

WORTHINGTON PUMP & MACHINERY CORP., Harrison, N. J.—Booths 312-314-411-413.

In attendance: C. E. Wilson, M. M. Lawler, W. F. Bishop, E. R. Michel, F. J. Watt, D. H. McCuaig, B. T. LaPierre, E. C. Hamilton, S. R. Hirsch, J. Neufhoff, C. C. Crawford, R. P. Lockett, J. E. Viguerie, G. R. Hammett, R. E. Newlin, W. B. Gregory, D. Williams, E. T. Keck, Jr., L. C. Duncan, J. E. Montgomery, E. J. Salaun, C. S. Rudloff.

Exhibiting: 50 ton capacity "Freon-12" refrigeration compressor, cutaway model: evaporative condenser; new 1950 model 5 ton package air conditioner; 25 ton capacity "Freon-12" condensing unit; three cylinder, 5 ton "Freon-12" hermetic compressor unit for package air conditioners; four row direct expansion coil for air conditioning units; 3 in. x 3 in. ammonia condensing unit; centrifugal refrigeration compressor for air conditioning systems; room air conditioning unit for large air conditioning systems.

YARNALL-WARING CO., Chestnut Hill, Philadelphia 18, Pa.—Booth 802.

In attendance: Leland C. Campbell, J. Macy.

Exhibiting: Seatless blowoff valves; "Gun-Pakt" expansion joint working model showing method of inserting plastic packing while joint is under line pressure; involute spray nozzles for air conditioning; impulse steam traps; strainers; "Hi-Lo" water column and "Sesure" gage; remote water level indicator for eye level readings.

YORK CORP., York, Pa.—Booths 736-740.

In attendance: J. R. Hertzler, L. P. Quinlivan, H. W. Broadwell, F. D. Graham, R. P. James, W. R. McGinnis, C. H. McLeod, J. F. Moss, R. S. Sandifer, H. Z. Thomas, C. W. Lane, A. C. Leske, Jr., A. C. Edwards, Leon E. Kinley.

Exhibiting: Latest developments in air conditioning and refrigeration systems and featuring a "Turbo" (centrifugal) compressor.

ZINK CO., JOHN, 4401 S. Peoria, Tulsa, Okla.—Booth 609.

In attendance Walter J. Combs.

Exhibiting: Floor furnaces, unit heaters, wall heaters, and burners.

ZONE HEAT REGULATOR CO., Box 188, Garrettsville, Ohio—Booth 412.

Quick Picture

ASHVE MEETING

At the Hotel Adolphus and the Baker Hotel, Dallas, with registration starting at 10 a.m., Sunday, January 22, on the mezzanine of the Baker. First session 9:30 a.m. Monday (Baker), second session 9:30 a.m. Tuesday (Adolphus), third session 9:30 a.m. Wednesday (Adolphus), fourth session 2:00 p.m. Wednesday (Adolphus), last session 10 a.m. Thursday (Adolphus). See program for further information.

EXPOSITION

Opens Monday, January 23, at 2 p.m., and daily Tuesday through Friday, 12 noon to 10 p.m., in the Hall of Agriculture and the Poultry Building at State Fair Park, Dallas. See list of exhibitors and diagrams of exhibit buildings for full information on "who, what and where."

ENTERTAINMENT

Ladies get-together, Sunday, 2:30 p.m. (Baker); ladies assembly, Monday, 10:30 a.m. (Baker); welcome luncheon, Monday, 12:30 p.m. (Adolphus); chuck wagon dinner, entertainment and dancing, Monday, 7 p.m.; luncheon meeting, Tuesday, 12:30 p.m. (Adolphus); ladies luncheon and style show, Tuesday, 12:30 p.m. (Baker); ladies theater party, Wednesday, 1:45 p.m. (leaving from Baker); annual banquet, Wednesday, 7 p.m. (Baker).

Heating, Piping & Air Conditioning

AMERICAN SOCIETY of HEATING and VENTILATING ENGINEERS

Journal Section

Physiologic Examination of the Effective Temperature Index

By Nathaniel Glickman*, Tohru Inouye**, Robert W. Keeton†, M.D., Chicago, Ill., and Maurice K. Fahnestock††, Urbana, Ill.

This paper is the result of research sponsored by the AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS and by the United States Public Health Service in cooperation with the University of Illinois, College of Medicine

IN RECENT years a number of investigators[1-4] have indicated that the effective temperature (ET) index places too much emphasis on the influence of relative humidity in determining sensations of warmth and coolness at temperatures customarily encountered in heating and ventilating practice and too little emphasis at the high temperatures. Houghten[5], endeavoring to explain the discrepancies, stated that most of the possible variations in the accuracy of the ET lines fall within a range of from

SUMMARY — In these experiments physiological measurements were used to study the response of 15 subjects to two different ambient environments having the same effective temperature (ET). Measurements included skin and rectal temperatures, evaporative weight loss, pulse rate and thermal sensations. Results obtained suggest that except for correction at the higher temperatures the present ET index is adequate for subjects in the dynamic state, wherein subjects passed back and forth between conditioned rooms and experienced instantaneous thermal impressions. However, for equilibrium conditions, the present ET index places too much emphasis on the influence of relative humidity.

½ to 3 deg ET. Bedford[6], on the other hand, indicated that the index is probably very reliable at ordinary temperatures but that some adjustment is needed at the very high temperatures.

These reports were based upon experiments with subjects in approximate equilibrium with the environment. The subjects of Winslow et al[1] were exposed to different ambient environments for two or more hours; the subjects of Yaglou[3] for three hours; and the data analyzed by Rowley et al[2] were for subjects exposed for one to two hours. The ET index, on the other hand, was developed from instantaneous thermal impressions of subjects passing back and forth between conditioned rooms. It is therefore conceivable that such an index developed under dynamic conditions would not be strictly applicable for equilibrium conditions.

Previous contributions from this laboratory[7-9] have discussed certain physiological adjustments of human subjects on exposure to sudden

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*Assistant Professor of Medicine and Research Physiologist, Department of Medicine, University of Illinois. Member of ASHVE.

**Research Assistant, Department of Medicine, University of Illinois.

†Head, Department of Medicine, University of Illinois. Member of ASHVE.

††Research Professor of Mechanical Engineering and Engineering Director of the Physical Environment Unit, Department of Mechanical Engineering, University of Illinois. Member of ASHVE.

[1] Exponent numerals refer to References.

For presentation at the 56th Annual Meeting of the AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS, Dallas, Tex., January 1950.

JOURNAL SECTION

Table 1—Description of Experimental Subjects

Subject	Age years	Height ft & in.	Weight lb	Area sq ft	ET[a]
C.A.	29	5 7	173	20.5	68.8, 73.4
J.B.	24	5 11¾	137	19.5	68.8, 73.4
M.B.	20	5 8½	136	18.7	68.8, 73.4
T.B.	25	5 11	160	20.7	59.6, 68.8, 73.4, 78.0, 82.6
H.I.	21	5 6	125	17.9	78.0
B.K.	24	5 9	139	18.8	68.8, 73.4
E.K.	23	6 0	190	22.6	59.6, 68.8, 73.4, 78.0
H.K.	21	5 9½	138	19.0	82.6
N.L.	25	5 6	159	19.6	82.6
Ab.R.	19	5 9	141	18.8	59.6, 78.0, 82.6
Ad.R.	21	5 8½	191	21.2	59.6, 78.0, 82.6
G.S.	28	5 11	188	22.0	59.6
J.S.	20	6 0	135	19.5	68.8, 73.4
R.S.	21	6 1	168	21.1	59.6, 78.0, 82.6
N.Z.	21	6 0	152	20.4	59.6, 78.0, 82.6

[a] Environments to which the subjects were exposed (two experiments at each ET).

change in environmental temperature and humidity. The purpose of the present study was to compare, by means of physiological measurements, the response of subjects to two different ambient environments having the same ET. Relative humidities of 30 and 80 percent were selected for each ET studied. Effective temperatures in the zones of body cooling, thermal neutrality and evaporative regulation were selected. The work was conducted with the subjects in approximate equilibrium with the environment as well as on exposure to sudden change in environment.

Test Measurements

Subjects: Fifteen healthy young adult male students, ranging in age from 19 to 29 years (average 23), participated in the experiments. Table 1 presents the physical description of the subjects and the effective temperatures to which they were exposed. Seven subjects were studied at each ET.

Procedure, Observations and Experimental Conditions: The procedure and observations have been described in the papers[7-9] cited. The subjects, dressed in thermocouple union suits, remained in room 1 (previously designated comfortable room 1) for one hour and then entered and remained in the hot room for one hour after which they returned to the first room now designated room 2 (previously designated comfortable room 2).

Observations included skin and rectal temperatures, evaporative weight loss, pulse rate, and thermal sensation.

The scale for thermal sensation was as follows: (1) Cold; (2) Cool; (3) Slightly Cool; (4) Comfortable; (5) Slightly warm; (6) Warm; (7) Hot. The subjects were trained in the use of the scale before starting the experiments. Intermediate votes such as 2½, 3½, or 4½ were accepted during the adjustment period.

The hot room was maintained, as in previous studies[7-9], at a dry bulb temperature (DBT) of 98.5 F ±1.0 deg with water vapor pressure of 0.599 ±0.036 pounds per square inch (psi)[*] corresponding to a relative humidity (RH) of 66 ±4 percent and 90.2 ET.

Ten ambient conditions were used in room 1 for which the ET, DBT, RH and water vapor pressure are presented in Table 2. Environment I represents the lowest ET, II the next lowest, etc. with V representing the highest ET. All environments designated by an A are those with 80 percent RH and all by a B with 30 percent RH. For example, environment II A would have the same ET as II B, but a higher RH and lower DBT.

Statistical Analysis of the Data: Student's[10, 11] method and tables designated for determining the significance of the mean of a small series of paired differences and Fisher's modification[12] (p.107) of Student's method for the comparison of two groups of unpaired data were used. Differences were considered significant when the probability (P) was less than 0.030. In addition, coefficients of correlation and correlation ratios were determined with the methods described by Ezekiel[13].

Results

Room 1. By the end of the hour of exposure to room 1, the subjects were in approximate equilibrium with the environment. The mean skin temperature (MT_s) had re-

Table 2—Environmental Conditions and Observations in Room 1

Environment	ET	DBT F	RH Percent	VP psi	MT_s F	T_R F	Thermal Sensation	EWL[b] gm/min	Pulse Rate beats/min
I A	59.6	60.5	80	0.209	86.0	98.6	2.9	0.83	72.1
I B	59.6	63.4	30	0.087	87.1[a]	98.4	3.1	0.90	75.6
II A	68.8	70.3	80	0.293	91.5	98.3	3.6	0.73	74.9
II B	68.8	76.0	30	0.133	92.6[a]	98.4	4.0	1.08[a]	74.9
III A	73.4	76.0	80	0.355	92.7	98.3	4.1	0.82	76.9
III B	73.4	82.3	30	0.164	93.7[a]	98.3	4.6	1.17[a]	77.1
IV A	78.0	80.7	80	0.415	93.7	98.6	4.5	0.88	79.7
IV B	78.0	89.6	30	0.207	94.3	98.5	5.3[a]	1.78[a]	80.1
V A	82.6	85.9	80	0.491	93.7	98.6	5.9	1.85	83.7
V B	82.6	97.5	30	0.264	94.7[a]	98.6	5.9	3.00[a]	87.0

[a] Difference statistically significant for that ET.
[b] Evaporative weight loss.

Symbols and Abbreviations

ET = effective temperature
DBT = dry bulb temperature
psi = pounds per square inch
RH = relative humidity
MT_s = mean skin temperature
T_R = rectal temperature
P = probability

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[*] 1 psi = 51.715 mm Hg.

mained relatively unchanged during the final 30 min for all environments except that designated I A. Here it showed a slight decrease during the final 20 min. The averages of the data obtained for these 10 ambient environments are presented in Table 2.

The final MT_s was significantly greater at the higher than at the lower DBT for four of the five effective temperatures studied ($P = 0.004$, 0.020, 0.016 and 0.002 for environments I, II, III and V, respectively). For environment IV, the MT_s was not significantly greater at the higher DBT although it was in the same direction as already given. This indicates that two conditions having the same ET will not necessarily have the same effect on MT_s. This has been pointed out by Yaglou[3] for MT_s and by Sheard[14] for forehead and extremity temperatures.

The average rectal temperature (T_R) was similar for the wide range of effective temperatures studied. If the subjects had remained in this room for a longer time at the coolest environment (zone of body cooling), a difference would have appeared.

The average pulse rate was similar for the two environments of the same ET but the rate was greater at the high effective temperatures.

It had been observed[15] that evaporative weight loss was slightly greater during the first 10-15 min after the subject resumed his seat on the balance. This was attributed to the evaporation of moisture initially present in the union suit. Once equilibrium was established, the rate became relatively constant and was due to loss from the body. The data, therefore, were analyzed from the time the rate of weight loss became constant. It was found (Table 2) that for four of the five effective temperatures studied the rate of weight loss was definitely greater for the condition having the higher DBT ($P = 0.012$, 0.025, 0.010 and 0.004 for conditions II, III, IV and V, respectively). For two conditions having the same ET in this environmental range, a greater evaporative weight loss was expected for the condition having the higher DBT and lower RH. This was also shown by Houghten et al[16].

Table 4—Observations in Hot Room

Environment	ΔMT_s at 10 Min F	Final MT_s F	ΔT_R in 10 Min F	Final T_R F	Thermal Sensation Initial	Thermal Sensation Final	Final Pulse Rate
I A	7.7	96.7	0.26	98.2	5.9	6.4	86.3
I B	7.9	96.8	0.26	98.4	6.3	6.4	84.0
II A	4.6	96.9	0.24	98.6	6.0	6.1	89.4
II B	4.2	97.0	0.08[a]	98.9	6.0	6.4	91.1
III A	3.6	97.0	0.28	98.6	6.5	6.4	91.4
III B	3.1	96.8	0.15[a]	98.7	6.3	6.4	91.4
IV A	2.7	97.3	0.11	99.0	6.2	6.6	93.1
IV B	2.4	97.0	0.03[b]	99.0	6.6	6.7	93.9
V A	2.3	97.0	0.13	98.9	6.6	6.9	93.4
V B	1.8	97.3	0.01[a]	99.1	6.8	6.9	101.1

[a] Difference statistically significant for that ET.
[b] Difference statistically suggestive for that ET.

Table 3 shows the distribution of votes recorded at the different ambient environments. The thermal sensations were not significantly different for two environments of the same ET (Table 2) with one exception. However, for environments II, III, and IV the votes tended to be higher for the higher dry bulb temperatures. The high correlation ratio, discussed in the following paragraphs, between thermal sensation and DBT and the absence of statistically significant differences between two environments of the same ET indicate that each group should contain a greater number of subjects before definite conclusions may be drawn.

Table 3—Range of Thermal Sensations and Number of Votes Recorded at the Different Ambient Environments in Room 1

Environment	2	2½	3	3½	4	4½	5	5½	6	6½	7
I A	2		3	2							
B		2	3	1	1						
II A			2	2	3						
B				1	5	1					
III A				1	4	1	1				
B					1	3	3				
IV A					2	3	2				
B						2	2		3		
V A							2	1	2	1	1
B							1	2	3		1

Hot Room: In general, the major part of the redistribution of blood is accomplished within 10 min of entering the hot room. This was observed for environments II, III, IV and V. The rapidity and magnitude of the increase in MT_s has been described[7]. The rapid increase was also noted for environments I A and I B but here the average MT_s remained significantly lower than that of the other groups for at least the first 40 min. By the end of the hour, however, the average mean skin temperatures were approximately the same for all groups (Table 4).

The increase for the first 10 min in the hot room exhibited an apparent linear correlation with the level of MT_s observed prior to entrance. The coefficient of correlation obtained was 0.82 ± 0.04 for a MT_s range of 85 F to 95 F. This linearity may not be retained at lower and higher mean skin temperatures.

The decrease in T_R within 10 min of entering the hot room was small but definite in eight of the 10 conditions (Table 4). Only in environments IV B and V B where the DBT and MT_s were the highest in room 1 did the T_R remain unchanged. This effect on T_R of sudden exposure to heat has been reported by this laboratory and others[7-9,17-22] and is a result of the transfer of heat from the deep to the superficial tissues. For previous exposures to two environments having the same ET, the decrease was slightly less for the environment having the higher DBT and MT_S, with the exception of environment I.

For all environments, except I A and I B, the final T_R in the hot room showed an increase over the final room 1 value. The increases were not significantly different for each pair of environments having the same ET. For I A the T_R decreased 0.4 F whereas no change occurred for I B. The difference was significant (P = 0.010). For these two environments in room 1 the MT_S averaged at least 4.4 and 5.5 F lower than at any of the other conditions (Table 2). And, as mentioned, the MT_S remained significantly lower than that of the other groups for the first 40 min in the hot room.

The average change in pulse rate from the end of room 1 to the end of the hot room (Tables 2 and 4) was similar for all environments. The final pulse rate in the hot room was greater when the subjects were previously exposed to the higher ambient environments of room 1.

The amount of perspiration which occurred in the hot room was estimated according to the formula previously presented[7]. In general, the subjects perspired more when the preceding exposure in room 1 was to the higher dry bulb temperatures.

The degree of warmth experienced upon entering the hot room (Table 4) was not significantly different for each of two environments having the same ET and apparently bears little relationship to the thermal sensation, ambient environment, or MT_S in room 1. If each group had contained a greater number of subjects, the initial sensation of warmth might have been significantly different for the two extreme conditions (I *vs.* V). The *change* in thermal sensation is, of course, related to the factors mentioned.

After one hour in the hot room, sensation of warmth was similar for all conditions, except that after a previous exposure to environment V the subjects felt definitely (P = 0.016) warmer than after exposure to environment I.

Room 2 (After hot room exposure): Upon subjects' re-entrance of this room, the MT_S decreased rapidly (Fig. 1), as has been previously shown[7-9]. For the first 10 min, as well as for the hour, the change from the final hot room value was about the same for each environment having the same ET, except for environment V. Here the decrease was slightly less at 10 min (M = 0.7 F; P = 0.019) and at the end of the hour (M = 1.2 F; P = 0.004) for the environment having the higher DBT (V B). Also, for this environment only, the final MT_S in room 2 was significantly higher for the higher DBT. This suggests that under dynamic conditions, with perspiration present on the body and in the union suit, the ET index is applicable for MT_S changes with slight modification at the warmest environment (V). Here again it appears that less emphasis should be placed on relative humidity.

It is of interest to note the effect of RH upon the decrease in MT_S during the first 10 min in room 2. A previous observation that the decrease in MT_S was significantly greater at 30 than at 80 percent RH when the DBT was 76 F[7] was confirmed. Further, by comparing the response obtained for environment III B (82.3 F and 30 percent RH) with that obtained for environment IV A (80.7 F and 80 percent RH) it was found that the decrease was slightly greater for III B. Similarly, in comparing environment IV B (89.6 F and 30 percent RH) with environment V A (85.9 F and 80 percent RH) the decrease was definitely greater for IV B despite its higher DBT.

RH also appeared to influence the change in MT_S during the entire exposure in room 2. When all experiments at 30 percent were compared with those at 80 percent, the change in MT_S was slightly less (M = 0.6 F; P = 0.007) for the 80 percent group. This held true even for the last 30 min in room 2 (M = 0.3 F; P < 0.001).

The T_R showed a slight but definite increase within 10 min of entering room 2 for all environments.

Table 5—Observations in Room 2

Environment	ΔMT_S at 10 Min F	Final MT_S F	ΔT_R in 10 Min F	Final T_R F	Thermal Sensation					EWL[b] gms	Pulse Rate	
					Initial	3 Min	5 Min	10 Min	Final		3 Min	60 Min
I A	8.1	85.6	0.23	98.3	1.9	1.7	1.8	1.9	2.4	75.3	76.1	69.7
I B	8.5	85.9	0.23	98.3	1.6	1.4	1.4	1.9	2.9	104.1[a]	78.9	69.7
II A	5.2	90.4	0.19	98.3	1.9	2.1	2.3	2.9	3.6	94.4	77.1	72.9
II B	6.0	90.6	0.12	98.3	1.8	2.1	2.4	2.8	3.8	120.3[a]	77.4	72.6
III A	4.3	91.5	0.18	98.4	2.0	1.9	2.2	2.8	3.9	99.3	80.1	74.9
III B	4.4	92.0	0.13	98.3	1.9	2.1	2.4	2.9	4.1	135.0[a]	81.1	78.7
IV A	3.9	91.8	0.23	98.9	2.9	2.9	2.7	3.1	4.0	132.7	84.0	80.3
IV B	3.9	92.2	0.17	99.0	2.4	2.4	2.5	2.6	4.0	190.9[a]	84.3	84.9
V A	2.8	92.8	0.24	99.1	2.7	3.4	3.6	3.8	4.4	143.3	85.7	82.3
V B	2.1[a]	94.3[a]	0.20	99.3	2.6	3.6	3.9	4.5	5.2	204.4[a]	92.3	86.0

[a] Difference statistically significant for that ET.
[b] Evaporative weight loss.

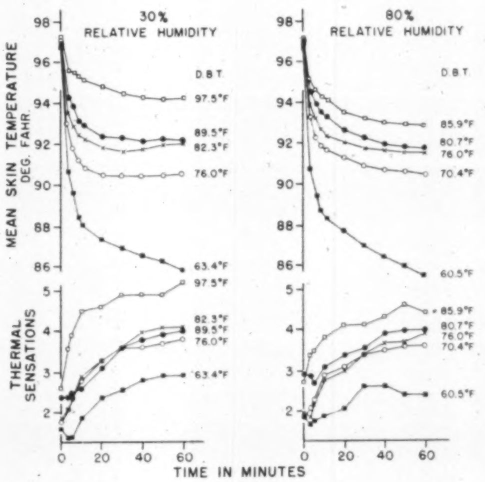

Fig. 1—MT_s and thermal sensations in room 2 for the 10 ambient environments

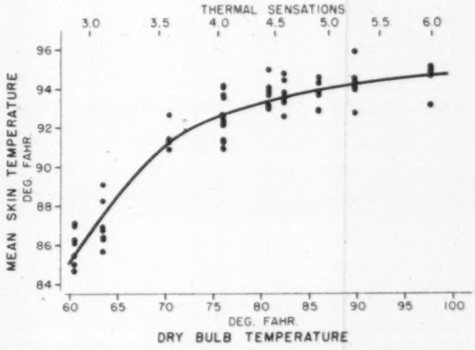

Fig. 2—Relation of MT_s to DBT with thermal sensations expected

This has been discussed[7-9,21,22]. The magnitude of the change, however, was not affected by the ET of room 2, since the increase was about the same for all environments. Nor was the change from the end of the hot room to the end of room 2 significantly different for each of two environments having the same ET.

The first pulse rate was obtained about 3 min after entering room 2 and at regular intervals thereafter. The average change in pulse rate during the hour from the final value in the hot room was similar for the two environments of the same ET. However, the final pulse rate was greater at the higher ambient conditions as was noted in the exposure to room 1 and in the hot room.

The weight upon entrance into room 2 could not be accurately determined. Therefore, the evaporative weight loss in room 2 was interpolated to a standard time (5 min) after the first weight. Table 5 presents the average evaporative weight loss for each ambient environment. The evaporative weight loss was significantly greater at the lower than at the higher RH for all of the effective temperatures studied even though the differences were small. Further, it should be noted that the amount of moisture available for evaporation upon entrance into room 2 was greater at the lower than at the higher RH for each ET studied.

Thermal Sensation: The averages of the votes recorded in room 2 for the 10 ambient environments studied are shown in the lower portion of Fig. 1.

The *initial* thermal sensation upon entering room 2, after the hot room exposure, was similar for the two environments of the same ET (Table 5). This was to be expected since the *ET Index* was predicated upon *instantaneous* thermal reactions. Further, the thermal sensations were not significantly different during the hour (3,5,10,20 min, etc.) for the two environments of the same ET (Table 5), although some differences in means were present.

Since the thermal sensations for the two environments of the same ET were not significantly different at comparable times during the hour these votes were grouped. The mean values obtained for each ET were then compared. This revealed that the *initial* sensation of coolness was approximately the same for environments I, II, III (59.6, 68.8 and 73.4 ET, respectively) even though the DBT ranged from 60.5 to 82.3 F. The explanation for this lies in the fact that the experiments were conducted on different days and that the *subjects were not comparing one environment with another;* their votes expressed their thermal sensations at that moment. Within *three minutes*, however, the sensation of coolness was definitely less for environment II than for environment I ($P = 0.023$) and the subjects remained definitely less cool for the remainder of the hour. This was also true for the comparison of environment I with III, although the difference at 3 min was only slightly suggestive. The subjects were definitely cooler in environment I than in IV or V from the *moment of entrance* to the end of the hour.

Only when the subjects entered environment IV (78 ET) did the *initial* votes show a difference in the sensation of coolness experienced. Upon entrance into environment IV, the subjects definitely voted higher than for environment II ($P = 0.021$) and suggestively higher than for environment III ($P = 0.041$). For the remainder of the hour there was a striking similarity in votes for environments II, III and IV (68.8, 73.4 and 78.0 ET, respectively). It should be noted here that even though the average votes for environments IV A and IV B were higher than for environments II A, II B, III A or III B during the first 5 min in room 2 (Table 5) the differences between the means were not statistically significant.

When the subjects were exposed to the highest ET studied (environment V), they were definitely warmer than in the other environments from the moment of entrance to the end of the hour, with one exception. Only for the *initial* vote in room 2 was there no significant difference between environment V and IV.

Correlation of Thermal Sensations with MT_s, ET and DBT in Room 1: In a previous report[7], a discussion of the range of MT_s at a time when subjects were comfortable was presented. In the present study, as a result of the wide range in ambient conditions, a greater range of thermal sensations has been obtained in room 1 in which the subjects were in approximate equilibrium with the environment. These data permit the calculation of the following correlation ratios for the entire range of ambient conditions studied.

	Correlation ratio	Standard error
Thermal sensation and MT_s	+0.70	±0.06
Thermal sensation and ET	+0.85	±0.03
Thermal sensation and DBT	+0.86	±0.03

All three correlation ratios are highly significant. A prediction of thermal sensation, however, could be obtained with greater reliability with either DBT or ET than with MT_s. Dry bulb temperature, of course, is the simplest to obtain. It should be mentioned, however, that at very high dry bulb temperatures and high humidities such a relationship would not hold.

Bedford[6] concluded that comfort could be predicted with slightly greater accuracy if the warmth of the room were known rather than the skin temperature of the individual. His conclusion, however, was based upon the use of only three skin areas, not MT_s. Furthermore, two of the three skin temperatures were on the extremities.

Definition of Comfort and Discomfort. The term *comfort* is one part of the scale of thermal sensations as used by this laboratory and others. Actually, comfort is not a sensation in itself; rather, it is a *feeling-state*. Leopold[23] indicated the need for an adequate definition of comfort. The authors offer the following definition:

Comfort, in terms of thermal sensations to the physical environment, is a derived state of feeling based upon a physiological balance of the individual to his environment wherein the thermal stimuli are of low intensity.

Discomfort, in terms of thermal sensations to the physical environment, is a derived state of feeling based upon a physiological imbalance of the individual to his environment or a physiological balance wherein the thermal stimuli are of high intensity.

The intensity of the thermal stimuli required to effect a change in the feeling-state should be determined by research in the near future.

Correlation of MT_s with ET and DBT in Room 1: A very high correlation ratio was obtained with MT_s and ET or DBT.

	Correlation ratio	Standard error
MT_s and ET	+0.95	±0.01
MT_s and DBT	+0.96	±0.01

For predicting MT_s over the range of ambient conditions studied, either factor is equally good and both are significantly better ($P < 0.001$) than thermal sensation (*comfort* vote).

Hardy and DuBois[4] reported a high degree of correlation between MT_s and DBT for two nude male subjects under basal conditions. For every degree rise in environmental temperature the MT_s was about 0.5 F greater in the temperature range of 71.6 to 84.2 F.

Fig. 2 presents the distribution of MT_s plotted against DBT for all experiments in room 1. As mentioned, these data yield a correlation ratio of 0.96 ±0.01. The averages for thermal sensations expected at each DBT have been placed at the upper portion of the graph. This was done merely to indicate the level of MT_s at which different thermal sensations may be expected.

Table 6—Summary of Observations Obtained in Steady and Dynamic States

Observation	Room 1 Steady State	Room 2 Dynamic State
Mean Skin Temperature	−	+ (− for cond. V only)
Rectal Temperature	+	+
Thermal Sensation	±	+
Evaporative Weight Loss	−	−
Pulse Rate	+	+

Note: + indicates agreement with ET index

Table 6 summarizes the data presented in this paper. Observations in agreement with the ET index are indicated by a plus sign and those in disagreement by a minus sign. For the steady state, *i.e.*, with subjects in approximate equilibrium with the environment (room 1), it is apparent that differences exist for MT_s, evaporative weight loss, and probably for thermal sensation in the intermediate range. As measured by the effect on MT_s, the ET index places too much emphasis on the influence of relative humidity throughout the range of ambient conditions studied.

For the dynamic state, *i.e.*, in room 2 after an exposure to the hot room for one hour, the results were in agreement with the ET index except for MT_s at the highest ET studied (condition V) and for evaporative weight loss at all effective temperatures. As measured by the response of MT_s, RH is overemphasized at this high condition. The similarity in results obtained in the dynamic state for two ambient conditions having the same ET was not surprising. As mentioned earlier, the ET index was developed with subjects in a dynamic state.

Discussion

Yaglou[2] suggested that lines of equal MT_s be substituted for ET lines on the psychrometric chart. This was based upon (*a*) the close relationship between MT_s and thermal sensations in ambient conditions which are below the zone of evaporative regulation[1,25,26] and (*b*) upon data obtained in a few exploratory experiments on two subjects[3]. In this zone it is agreed that ET overemphasizes the influence of RH and that a high correlation exists between MT_s and DBT or ET. However, the substitution of lines of constant MT_s for ET lines in that temperature range is of questionable value. Thermal sensations can be predicted with greater reliability by DBT alone than by MT_s alone, as noted. Therefore, the introduction of another variable which is more difficult to obtain requires greater justification.

This, of course, does not imply that for all environmental conditions the DBT would be a better index of thermal sensation than MT_s. It is highly probable that for nonuniform environments, *e.g.* where there is asymmetry of radiation, with subjects under more or less equilibrium conditions, MT_s, as suggested by Yaglou[3], rather than DBT would be a better measure of thermal sensations. Under dynamic conditions, it is probable that the rate of change of MT_s correlated with the level of MT_s would prove a better measure. This was mentioned earlier[7]* and such a study is in progress covering a wide range of ambient conditions. Addition of the depth of the tissue gradient to the rate of change of MT_s and the level of MT_s would probably further improve the relationship.

Conclusions

Fifteen healthy young adult male students, clothed in 90 percent cotton union suits and wooden sandals, were subjects for the experiments. Each of the subjects was exposed to two ambient environments having the same ET, although only seven subjects comprised a group for study at each ET. ET in the zones of body cooling, thermal neutrality and evaporative regulation were selected. Observations of skin and rectal temperatures, evaporative weight loss, pulse rate and thermal sensations were obtained.

The data justify the following conclusions for subjects in approximate equilibrium with the ambient environment (room 1):

1. The final mean skin temperature (MT_s) was significantly greater at the higher than at the lower dry bulb temperature (DBT) for two ambient environments of the same ET.
2. The rectal temperature (T_R) was similar for the wide range of effective temperatures studied.
3. The pulse rate was similar for the two environments of the same ET but the rate was greater at the higher effective temperatures.
4. The rate of evaporative weight loss was definitely greater at the higher than at the lower DBT for two ambient environments of the same ET.
5. Thermal sensations were not significantly different, although they tended to be higher at the higher DBT, for two ambient environments of the same ET.
6. Thermal sensations were correlated with ET, DBT, and MT_s. All three correlation ratios are highly significant.
7. A definition of comfort and one of discomfort are offered.
8. MT_s correlated very highly with ET and DBT.

The data justify the following conclusions for subjects in a dynamic state, *i.e.*, in room 2 after one hour in the hot room:

1. The decrease in MT_s was similar for two ambient environments of the same ET, except for the highest ET studied.
2. The changes in T_R and pulse rate were similar for two ambient environments of the same ET.
3. The evaporative weight loss was significantly greater at the lower than at the higher relative humidity for all effective temperatures studied.
4. Thermal sensations were similar for two ambient environments of the same ET.

In general, the results suggest that the present ET index is adequate for subjects in the dynamic state (room 2) except for correction at the higher temperatures. For subjects in a steady state (room 1), the present ET index places too much emphasis on the influence of relative humidity for the range of ambient conditions studied.

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Air Conditioning As a Problem of Water Distribution and Disposal

by L. D. Gayton, C.E.,* Chicago, Ill

(A talk† presented before the Illinois Chapter, describing air conditioning studies made of the central business area of Chicago, Ill.)

The central business area studied is almost solidly built up with skyscraper structures containing theatres, retail stores, restaurants, hotels, and offices. As would be expected, in this area is the greatest concentration of air conditioning equipment in Chicago.

In the central business area of Chicago, as of December 31, 1932, there were 5200 tons of air conditioning equipment, and as of December 31, 1941, this figure had risen to 21,486 tons; an increase of over 300 percent in 10 years. By the end of 1948, the tonnage had increased to 28,641, or an increase of 33 percent in the seven year period from 1941 to the end of 1948.

If the entire 28,461 tons of air conditioning equipment in the Chicago business area in 1948 were operating at 100 percent capacity and required cooling water at a rate of 1.5 gpm per ton, the peak demand for air conditioning purposes alone, would be at a rate of 61,864,000 gal per day.

Surveys made in 1948 showed that the peak rate of water consumption (both for domestic purposes and air conditioning purposes) in this area, between noon and 3 p.m. was 75,000,000 gal per day.

The rate of water consumption reached a peak in 1948. The use of water for air conditioning was divided into five groups:

	1947	1948
Office Buildings	7888	9217
Stores	9521	9812
Theatres	3000	2835
Restaurants	5209	5673
Miscellaneous	1211	1104
TOTAL	26829	28641

As of December 31, 1932, in the entire city of Chicago, there were approximately 20,000 tons of air conditioning equipment, and as of December 31, 1941, this figure had increased to approximately 80,000 tons. Therefore, in the 10 year period from 1932 to 1941, inclusive, the tonnage and the demand for cooling water increased 300 percent. As of December 31, 1948, the air conditioning equipment in the entire city had increased to approximately 125,000 tons, or an increase of 56 percent in the seven year period from 1941 to the end of 1948.

If the entire 125,000 tons of air conditioning equipment were operating at 100 percent capacity and required cooling water at the rate of 1.5 gpm per ton, the peak demand for air conditioning purposes alone, in the entire city, would be at a rate of 270,000,000 gal per day.

Air conditioning is no longer considered a luxury; competition has made it a necessity in many lines of endeavor. If the air conditioning installations in the central business area should continue to increase in the future at the same rate that they increased from 1947 to 1948, 50,000 tons of air conditioning equipment would be installed by 1960.

If this 50,000 tons of equipment required cooling water at the same rate as in 1948, the peak water demand in this area for both domestic and air conditioning purposes would be 105,000,000 gal per day.

If, on an extremely hot day, this 50,000 tons of equipment were operating at 100 percent, and required cooling water at a rate of 1.5 gal per minute per ton, the peak demand for air conditioning alone would be at a rate of 108,000,000 gal a day. If we add to this a peak domestic demand in the central business area 30,000,000 gal a day, we get a possible peak demand in 1960, for both air conditioning and domestic usage, of 138,000,000 gal a day.

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†Abstract.

JOURNAL SECTION

Evaluating Heat Pump Performance

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Bloomfield, N. J.

SUMMARY — This paper describes a method of portraying the performance characteristics of the components of a heat pump in order that their combined performance under conditions of operation can be predicted with accuracy. This paper also describes the method used by the authors to evaluate predicted performance and to determine additional operating factors under actual conditions of use by means of field testing.

Any heat pump system consists of a series of components—evaporator, motor, compressor, condenser, liquid throttling device, auxiliaries, etc., each of which has certain inherent operating characteristics. To integrate these individual characteristics under variable conditions of heat source and heating requirements seems a formidable analytic procedure. Consequently, the expedient of arbitrarily assumed *design* conditions is usually resorted to in predicting performance. This prevailing tendency for over-simplification of heat pump performance is also due to scarcity of significant operating data.

It is becoming increasingly apparent that sizing methods prevalent for combustion heating are not adequate for heat pump heating, but that more precise data must be obtained before it will be possible to determine the best heat pump design, considering the effect of climate, the nature of the heat source and the influence of the building structure[1].

An analytical method is presented herein for more exactly predicting overall heat pump performance for heating operation. It includes consideration of heat source temperature variations and climate. A method is also presented for measuring actual performance both to check calculations and to supplement them with actual operating data not amenable to analysis.

General Design Principles

Before presenting the method developed by the authors for analyzing heat pump performance, it should be in order to briefly discuss first some basic design principles that must be observed in initially sizing components, particularly for heat pumps which obtain heat from the outdoor air.

In designing a heat pump the first consideration is the choice of a compressor and its driving motor. Basic capacity characteristics will dictate the initial choice, and the problem is then to determine how much heating and cooling can be obtained with the combination chosen.

Studies show that the compressor usually requires its maximum power during cooling operation at high outdoor temperatures, and the compressor speed is chosen to restrict the motor power under those conditions.

Anomalies may arise, for example, if multiple compressor units are to be used for heating. Here the speed of one compressor unit is determined to limit power under cooling conditions; successive compressor units are chosen to limit power at the highest outdoor temperature at which each will be required to furnish heat.

The design of the indoor coil follows accepted practice for direct expansion evaporator coil design. The requirements of high capacity together with appropriate dehumidification will result in an air flow through the indoor coil of approximately 400 cfm per ton of cooling. Such a coil is then generally satisfactory for heating on the reverse cycle as a condenser, if proper attention is given to refrigerant drainage.

Selecting the heat pick-up coil provides the designer with the widest range of choice. Fig. 1 illustrates one method that has been found helpful for an air-source heat pump. This curve indicates that there is a coil size that results in an optimum coefficient of performance (CP). The straight line shows the relation of CP with outdoor temperature with a fixed system. The curved line shows the change of CP if the suction pressure is held constant and the outdoor coil and air flow are varied. An optimum is determined where the two lines are tangent.

Physically, the interpretation is quite simple. A very large outdoor coil and corresponding air flow require so much fan power that the CP is reduced. A very small coil and air flow will operate at a low suction pressure, and the CP is accordingly reduced. Between these two extremes there is an optimum that will provide the highest CP.

This optimum coil will be subject to less hours of frosting per season, and during those hours the rate of frosting will be less. Being generously sized, its surface temperature will be close to that of the entering air, and as a consequence, the proportion of heat removed from the air, by condensation of water vapor, to sensible heat removal, will be small. Also a high surface temperature will permit operation for longer periods above 32 F than would a smaller coil with a lower surface temperature for the same entering air temperature.

A properly sized outdoor coil will, in addition, be large enough to provide for permissible condensing pressure for cooling operation.

With the major components of a heat pump system sized in accord-

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For presentation at the 56th Annual Meeting of the American Society of Heating and Ventilating Engineers, Dallas, Tex., January 1950.

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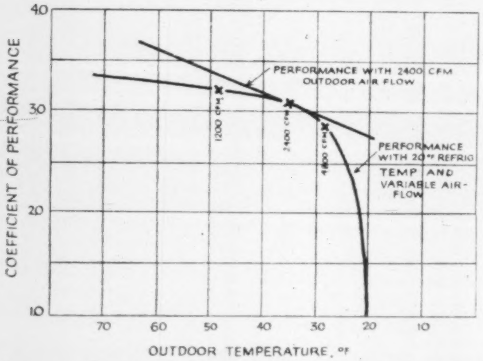
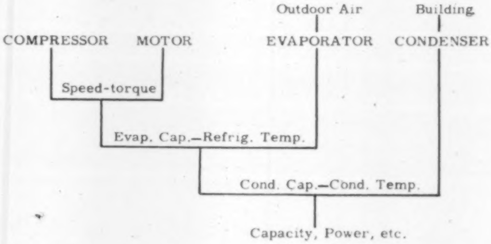


Fig. 1—*(left)* Method for choosing outdoor heat pickup coil

Table 1—Component Characteristics



ance with the foregoing considerations, it is now desirable to check expected operation by more detailed means.

Components Meet Changes in Operating Conditions

Each component of any machine has an operating characteristic which can usually be put in graphical form. The horizontal scale of such a plot represents the imposed condition, known as the independent variable. The relationships between points on the horizontal scale to those on the vertical scale are indicated by one or more lines or curves, each labeled with the values of other imposed conditions. These are called parameters. The numbers read off on the vertical scale portray a dependent variable, *i.e.*, the operating result obtained when the machine is required to meet a combination of two or more imposed operating conditions.

A direct-current motor affords a convenient example. The connected machine, in response to the requirements imposed on it, fixes the torque, or turning effort, at the motor shaft. A given voltage will then result in a definite motor speed. In this case the torque, voltage and speed are, respectively; independent variable, parameter and dependent variable.

The example could be carried further by considering the characteristic of a machine driven by the motor. If this were a pump, for example, its operation could also be plotted on the same speed and torque scales but the parameter lines might be labeled as water flows at specified pressures. The pump lines cross those of the motor, revealing new relations with the result that speed and torque no longer need be considered. In other words, the operating characteristic of the motor and pump as a unit now consists of voltage, water flow and pressure; any one of which might be an imposed condition, with one of the remainder as a controllable variable, while the third is a desired result.

The major subassemblies of an air-to-air heat pump have interlocking characteristics, meaning that a change of any imposed condition sets up a series of automatic adjustments in the operation of the components. The wide range of temperature and moisture combinations of the outdoor air heat source must be accounted for. A range of heating and cooling loads must be supplied as dictated by the combination of building structure, climate, and usage. Variations in electric power supply and water temperature (for auxiliary heat source) must be considered. From the many combinations and proportions available, the heat pump designer must select those which will lead to good value from the user's viewpoint—the most and best for the least. Finally, the heating or cooling must be delivered to the conditioned space in a way acceptable to the user. He does not want, for example, a gale of 22,500 cfm of cold 72 F air, nor only 360 cfm at a hot 200 F, but perhaps, 1500 cfm at 100 F.

It would be prohibitively expensive to develop an air-to-air heat pump by trying out dozens of combinations in full-range laboratory or field tests. Instead, the designer must make a whole-hearted attempt at a complete analysis on paper rather than the customary two or three calculated points to be connected by experience and intuition.

The heat pump circuit can be linked by component characteristics as diagrammed in Table 1.

A specific procedure for combining the component characteristics is given, starting with the compressor motor and assuming the unit on heating duty:

Compressor Motor. Fig. 2-A is a speed torque curve based on compressor speed and compressor torque (by putting in ratio of compressor to motor pulleys as one set of parameters.) For convenience, percent-full-load curves are also plotted.

Compressor (Speed-Torque). Fig. 2-B is the compressor power characteristic plotted on the same speed and torque coordinates used in Fig. 2-A for the motor. Suction saturated refrigerant temperature is the main parameter. (This is equivalent to suction pressure or suction refrigerant density, but is a better common denominator as will be seen later). The condensing temperature (synonymous with compressor discharge pressure but again more convenient here) is not yet decided for this system but has to be known in order to calculate Fig. 2-B. To get around this difficulty, three transparent curves are made; one each for 110 F, 120 F, and 130 F condensing temperatures in the example being cited. By advance inspection it was known that the balancing temperatures will be near this range.

Motor-Compressor Unit. Fig. 2-A is superimposed on Fig. 2-B, as in Fig. 2-C, to obtain a combined characteristic for the motor and compressor. The three charts in Fig. 2-B can be used in turn as overlays to give compressor *operating lines* which relate suction saturated temperature, speed, and torque for any desired pulley ratio. Compressor shaft horsepower can be calculated in turn from speed and torque. Each series of performance figures is for the condensing temperature noted on the Fig. 2-B overlay used.

Compressor Cooling Capacity. By assuming no superheat at compressor inlet and no subcooling of refrigerant liquid, compressor cooling capacity (heat pick-up) and compressor shaft horsepower can be plotted against suction saturated temperature with compressor speed as a parameter. For this purpose, the two-quadrant curve in Fig. 3-A is convenient. Again, three transparent charts for condensing temperatures of 110, 120 and 130 F are used.

Evaporgtor Cooling Capacity. In the case of an evaporator, cooling capacity (heat pick-up) can be plotted against suction saturated refrigerant temperature with the dry bulb and wet bulb temperatures of the entering air as parameters. Fig. 3-B is a transparent chart with scales corresponding to the upper quadrant of Fig. 3-A. A different chart must be available for each evaporator air flow contemplated. Space does not permit describing in detail how this chart was derived. However, Fig. 5 indicates the method by which evaporator coil heat transfer performance can be summarized on a small transparency which serves as a rapid calculator when placed over an appropriate psychrometric chart.

Motor-Compressor-Evaporator Unit. Fig. 3-B is placed over the upper quadrant of Fig. 3-A to form the chart shown in Fig. 3-C. Condensing temperature, against which the combination works, is determined by the choice of Chart 3-A; while the evaporator air flow choice depends on Chart 3-B. The motor and pulley ratio choices are transferred from Fig. 2-C by plotting compressor *operating lines* on Fig. 3-C (taking care that the condensing temperatures of Figs. 2-B, 2-C, 3-A, and 3-C correspond). At this point it can be mentioned that the overlaying transparencies, complete with inscribed curves, can be blueprinted to preserve a record of the results.

Fig. 3-B relates evaporator capacity to the entering wet bulb and dry bulb temperature of the outdoor air. Its combination with compressor capacity as in 3-C provides a unique and valuable tool for analyzing system performance. It relates heat pick-up, suction saturated refrigerant temperature, compressor speed, and shaft horsepower with entering outdoor air dry bulb and wet bulb temperatures—for specified compressor motor and drive, outdoor coil air flow, and condensing temperature.

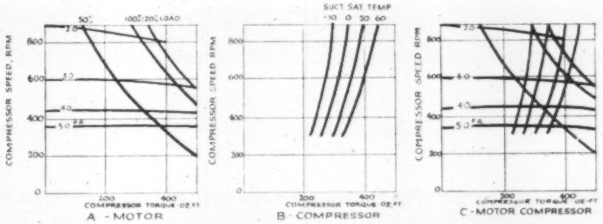


Fig. 2—Graph for heat pump performance analysis

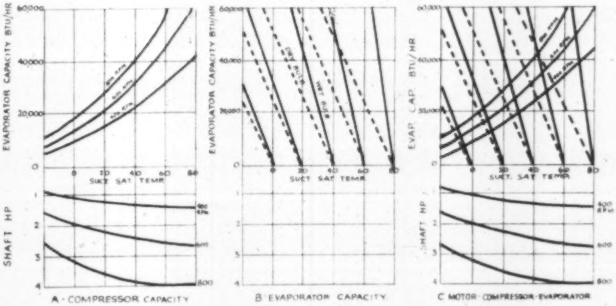


Fig. 3—Graph for heat pump performance analysis

After establishing a compressor *operating line* on Fig. 3-C, the compressor-evaporator balance point can be found for any particular combination of wet and dry bulb temperature.

If the temperature point falls below the operating line, the coil will operate wet (or frosted) and wet bulb temperature *rules.* That is, one should follow up the slanting wet bulb line to an intersection with the operating line to obtain refrigerant temperature, cooling capacity, compressor speed, and go down the refrigerant line to the lower curve to obtain horsepower. If the temperature point falls above the operating line, the coil is operating dry and dry bulb temperature *rules.* Follow down the slanting dry bulb line to an intersection with the operating line to obtain the balance point.

System Balance. The condenser remains as the last component to be considered in order to close the heat pump circuit. Heretofore, three separate condensing temperatures of 110, 120 and 130 F have been carried through the calculations. Now, however, it is necessary to establish a specific condensing temperature for each condition of operation in order to complete the system balance. For this purpose, condenser heat output is determined from the motor-compressor-evaporator combination and is cross plotted with condenser heat transfer characteristics to establish a condensing temperature.

Fig. 4-A shows a convenient method of summarizing condenser heat transfer performance. When superimposed over a temperature scale, as in Fig. 4-B, the condensing temperature is indicated at the intersection of the T_c line with the horizontal temperature scale for any desired air flow. Capacity, entering air temperature and leaving air temperature can be read off for any combination. Data obtained from 4-B are then used to construct the slanting-line chart in the upper quadrant of Fig. 4-C. This is condenser heating capacity plotted against condensing temperature with entering air temperature as the parameter. The near-horizontal lines in the upper quadrant are condenser heating capacities as approximated by adding evaporator capacity and compressor input (in Btu per hour). The intersection of two lines for any appropriate set of conditions indicates the condenser balance point. Condenser capacity and condensing temperature can now be read off.

The lower quadrant of Fig. 4-C relates compressor input with condensing temperature for various outdoor air conditions as obtained from Fig. 3-C.

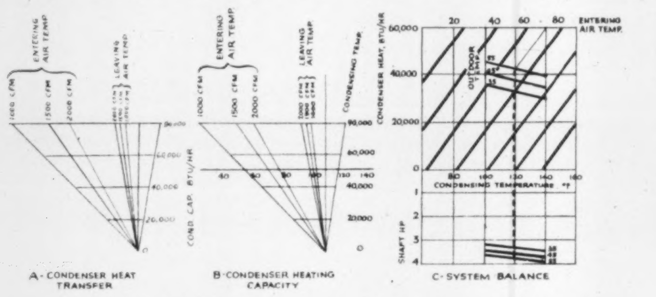


Fig. 4—Graph for heat pump performance analysis

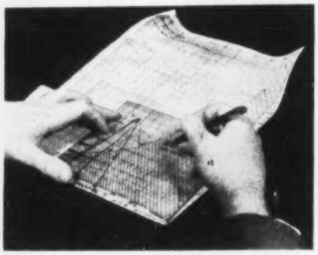


Fig. 5—Illustrating evaporator performance analysis

It is now possible to establish evaporator capacity with the system balance thus obtained.

Net Heating Capacity. The net heat pump heating capacity can be obtained by the following relation:

$$Q_h = Q_{ev} + Q_{cm} + Q_{fm}$$

Where

Q_h = Net heat output

Q_{ev} = Evaporator capacity

Q_{cm} = Thermal equivalent of compressor motor input

Q_{fm} = Thermal equivalent of fan power that is recoverable as useful heat

Use of Performance Curves

The precise method by which the performance curves of Figs. 2 to 4 are used depends upon the exact heat pump system contemplated. In the case of a heat pump, for example, which obtains heat from a source other than outdoor air, curves of a different nature will be required for Fig. 3-B.

Fig. 6 illustrates the overall heating performance of a specific heat pump, obtained by applying the described calculation methods. Heating capacity, supply air temperature, electrical input and economy are all related to outdoor temperature. The heat pump cited has the following general specifications:

1. Heat pump uses outdoor air as basic heat source and water as an auxiliary heat source.
2. Two compressors are incorporated in the same refrigeration circuit, only one of which is used for cooling operation, while either one or both is used for heating, depending on the demand for heat.

To make the fullest possible use of heat pump performance characteristics, they must be extended to take into account the building to be air conditioned and the climate to be experienced.

Effect of Building and Climate

Two climate factors affect heating performance: *first*, the range in dry bulb temperature, and *second*, the range in humidity or wet bulb temperature. Another very important climate factor is the minimum expected temperature, because this will determine, for a particular heat pump, the largest building which can be satisfied in that climate. To a lesser degree, the humidity factor of the climate will affect the performance of the unit, and in addition, determine the amount of outdoor coil defrosting necessary.

The climate can be most readily presented for calculating purposes as an *hours at* tabulation of wet bulb depression *vs.* dry bulb temperature as on Fig. 7. This particular climate is that of Chattanooga, Tenn.[2] It is interesting to note how the hours tend toward the zero depression line (100 percent humidity). It can be noted that most of the operating hours are in the *wet* region of unit operation. In Fig. 7, the outdoor dry bulb temperature is in 5 degree steps; this simplifies the figure and also shows that climatic conditions are fairly regular on a yearly basis, even though daily changes often can be very rapid.

Table 2—Heating Needs

Temperature Range	Heating Needed Btu (millions)	Power Req'd kwhr	Compressor Operation	Hrs
32 to 70	74.9	7220	No. 1 alone	2146
15 to 32	21.1	2810	No. 1 and No. 2	195
5 to 15	1.9	250	Auxiliary	15
	97.9	10,280		

Let us now consider heat pump performance on heating under these foregoing conditions. Of course, at a particular dry bulb temperature several capacities are encountered depending on the wet bulb depression and ranging from maximum at saturation to minimum at dry coil operation. Calculation has shown that this variation in operation is essentially linear with wet bulb depression. Hence with the *hours at* data given in Fig. 7, and the maximum and minimum capacities at a particular dry bulb, a median capacity can be calculated for each particular dry bulb temperature. It is to be noted that the capacity curves in Fig. 6 only show this weighted average curve. Another climate may present a slightly different humidity pattern.

The combination of the performance curves with the *hours at* climate data can yield a good picture of the heat pump operation. For instance, for this climate and building, 97.9 million Btu are needed during a heating season while using 10,280 kwhr. Table 2 shows how these heating needs are split as a function of outdoor temperature. Less than 2 percent of the heating load is needed between 5 and 15 F. Thus the typical operation can be seen where the weather has a long

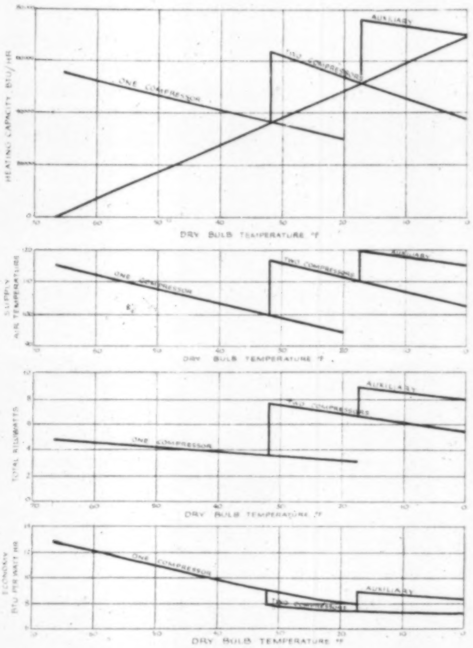


Fig. 6—Heat pump performance curves for heating

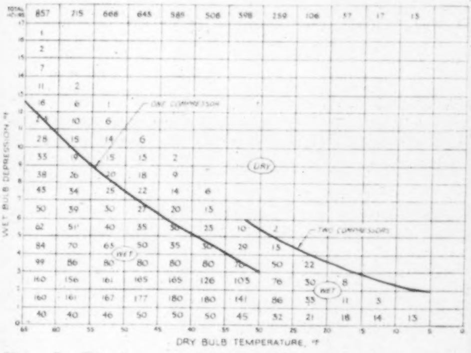


Fig. 7—Weather conditions influencing heat pump operations

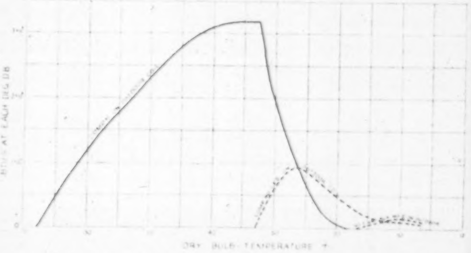


Fig. 8—Total heat produced for typical season

tail covering a number of degrees but involving very few hours. A pictured representation presented elsewhere illustrates this[3].

Another picture of the typical heat pump operation is obtained by plotting the Btu delivered at a particular dry bulb over the heating season as in Fig. 8. Here it can be seen that the No. 1 compressor alone takes the major load. The hours of operation of each combination can be calculated as listed in Table 2. This shows the great usefulness of the auxiliary heat source. Essentially there are very few hours between 5 and 15 F in this typical climate, but these hours nevertheless must be taken care of by the heat pump. To keep down the equipment investment some auxiliary source of heat is very desirable. If water were used at the rate of 10 gpm for the auxiliary hours, this would amount to less than $10.00 a year at nominal rates. This is worthwhile to conserve on equipment size.

These are, of course, but a few of the many pieces of information which can be gathered from the calculated combination of building and climate. The discussion of the combination has been centered about the maximum building size that can be heated by the given heat pump since it is the most critical case. As building size decreases, obviously less auxiliary heat is necessary for this heat pump to operate satisfactorily. For a still smaller building (or the same building in a milder climate), no auxiliary heat would be necessary at all. At some point economy would dictate the need for a smaller heat pump model.

Further Work Necessary

Some points in the previous discussion could be elaborated further. For instance, it is well known that there is a lag between weather and its effect on the inside of a building. In the point-by-point calculation it was assumed that the building heat loss was a function only of the outdoor temperature and that the heat pump would be obtaining heat from outdoor air at that temperature. Actually, the time lag of the building tends to reduce the maximum amount of heat required so that the calculated size is conservative. Also, the assumption that the heat pump must have sufficient capacity to take care of the minimum expected temperature is conservative, since generally these minimums are of short duration and occur at night when comfort requirements are not usually so strict.

The cycling operation of the heat pump cannot be completely described from these steady-state calculations. Further analysis could attempt to appraise this type of operation but testing in the field appears to be the best way to get an exact answer.

In making these calculations no allowance was made for any ventilation air. A ventilation schedule could be set up with very little sacrifice in economy in return for many comfort benefits.

Analytical results such as these often lead to valuable features and suggest refinements of heat pump design. Their basic worth, however, is to serve as a tool in calculating heat pump performance in specified climates so that the proper kind and size of machine can be installed and give comfortable air conditions the year 'round.

Field Testing Program

As a means for obtaining reliable operating data under actual conditions of use, a field testing program is under way. Packaged heat pump units have been installed in different types of buildings in widely different climates. Most of these units have been installed by various electric utility companies which are cooperating in the testing program.

One of the installations is in an appliance store in Bloomfield, N. J., shown in Fig. 9. This heat pump is basically an air-to-air unit, the operating scheme of which was previously outlined. One of its two compressors operates during cooling, and one or both compressors can be used for heating depending on capacity requirements. There is also provision for augmenting the air source by obtaining heat from water when additional capacity is needed during cold weather peaks.

The store is a rectangular brick building with an area of 1300 sq ft and contains no internal partitions. The front two-thirds of the store is used for displaying merchandise and is divided by a counter from the manager's office. The heat loss, calculated by standard methods, is 90,145 Btu per hr and the heat gain 42,244 Btu per hr.

The heat pump is located in the front section of the store, near a side wall. Fig. 10 shows the unit located within the store. The outdoor ducts are attached to the back of the unit and pass through the south wall to the outside, where they are separated in order to minimize recirculation between the intake and discharge. The conditioned indoor air is discharged through a grille across the front of the unit. Adjustable vanes are set for even air distribution throughout the store. Conditioned air to be recirculated is drawn in through filters at the back of the unit. The amount of outdoor air is regulated by an adjustable damper within the unit. A wall-mounted thermostat controls the temperature in the store in response to a single setting. The heat pump either heats or cools the store in order to maintain the required comfort conditions.

The Joint Heat Pump Committee of the *Association of Edison Illuminating Companies* and the *Edison Electric Institute* has outlined a standardized field test method for determining the coefficient of performance and performance factor for heat pump installations.[4] Definitions adopted by the Joint *AEIC-EEI* Heat Pump Committee are as follows:

> The heating coefficient of performance of an installed heat pump shall be the total useful heating effect produced by the heat pump system at stated conditions, divided by the heat equivalent of the total energy input to the system.
>
> The term *performance factor* shall be employed when referring to a value based on an extended period of time, stating the period of time covered.

The Joint *AEIC-EEI* Heat Pump Committee has suggested that the measurements taken in field tests should be such as to provide actual heat pump output based on known characteristics of the compressor and refrigerant (*calibrated compressor*). Measurements of air quantity in the field can seldom be made with acceptable accuracy, and consequently air flow-temperature methods of measuring output are not acceptable for field tests.

Since the heat pump for the installation described herein was completely fabricated in the factory, it was practicable to test it in the laboratory with accurate measuring equipment before installation in order to obtain exact calibrations of its performance. Readings were thus obtained of its heating and cooling capacity over a complete range of operating conditions for each mode of operation, from which curves were prepared for gaging performance after installation.

Instruments for indicating the required field test data are mounted on a panel board in the basement of the store. A 16 mm movie camera, arranged for taking single frame exposures, is focused on the panel board, and relays connected to the heat pump controls cause the camera to take one picture each time the heat pump starts or stops any

Fig. 9—Appliance store used as "guinea pig" for heat pump

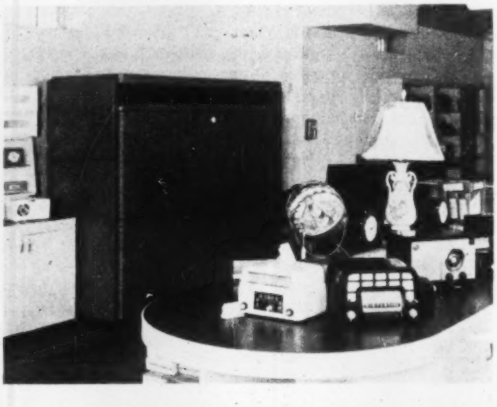


Fig. 10—*(right)* Packaged heat pump in store

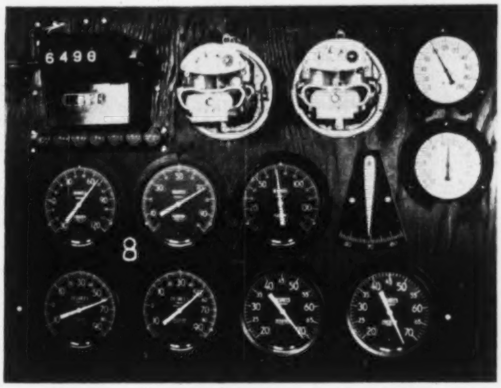


Fig. 11—Special test panel for heat pump field tests

of its possible seven modes of operation. In addition to these pictures, an exposure is made of the panel board every hour, on the hour, regardless of heat pump operation. The 2000 frames in one magazine of film will last from two to four weeks depending on the cycling of the machine, which in turn is dependent on the weather. Four reflector flood bulbs illuminate the board during each exposure.

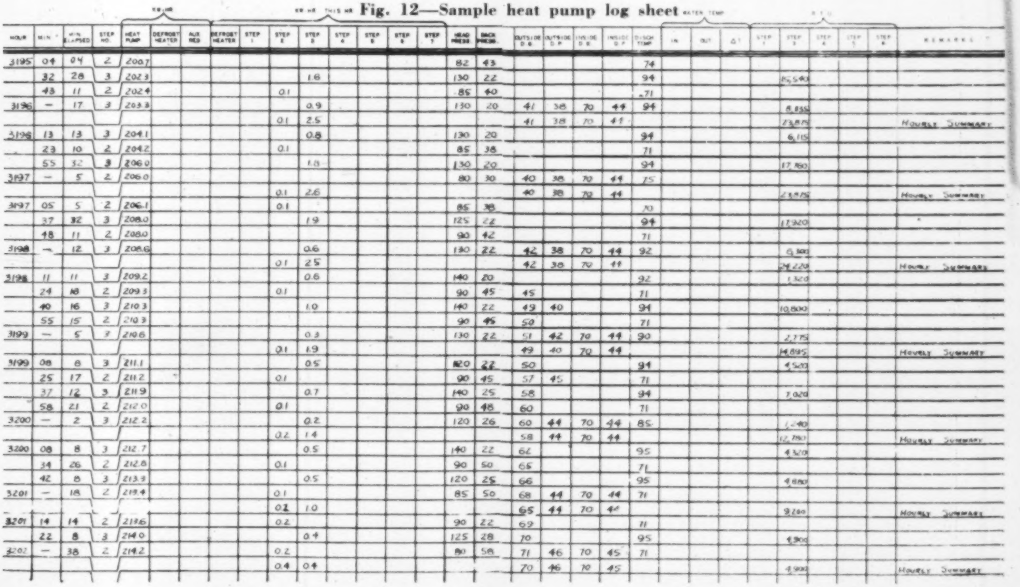
Fig. 11 shows the recording panel. The information obtained from the instruments on the panel board consists of: *a.* hour of year since Jan. 1, 00 a.m. Standard Time; *b.* minute (0 to 60); *c.* kilowatthour reading of heat pump power; *d.* kilowatthour reading of power for defrost storage heater; *e.* mode of operation; *f.* outdoor dry bulb temperature; *g.* outdoor dew point temperature; *h.* indoor dry bulb temperature; *i.* indoor dew point temperature; *j.* indoor air supply temperature; *k.* auxiliary water temperature *in; l.* auxiliary water temperature *out; m.* compressor suction pressure; *n.* compressor discharge pressure; *o.* indication of thermostat setting; *p.* any remarks that have been noted in chalk on the panel board.

Data Analyses

The previous section has described the film data that are taken. This section deals with the method of utilizing the data recorded on the film.

Fig. 12 shows a log sheet onto which the data are transcribed. A film reader is conveniently used to enlarge and project each frame on a ground glass screen. For transferring instrument readings from the film to the log sheet, the *time interval* between readings is taken as the difference of two successive time readings. The previous *mode of operation* (*step* number) on which the heat pump was running is indicated by the target lights. The *kilowatthours* expended in the time interval are entered into the column provided for each mode of operation. The *head pressure* and *suction pressure* are recorded directly. *Temperatures* are recorded

Fig. 12—Sample heat pump log sheet



				KW HR			KW HR THIS HR															WATER TEMP			BTU					
HOUR	MIN	MIN ELAPSED	STEP NO.	HEAT PUMP	DEFROST HEATER	AUX RES	DEFROST HEATER	STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6	STEP 7	HEAD PRESS.	BACK PRESS.	OUTSIDE D.B.	OUTSIDE D.P.	INSIDE D.B.	INSIDE D.P.	DISCH TEMP	IN	OUT	ΔT	STEP 1	STEP 3	STEP 4	STEP 5	STEP 6	REMARKS
3195	04	04	2	200.7											82	43					74									
	32	28	3	202.3						1.8					130	22					94					15,540				
	43	11	2	202.4					0.1						85	40					71									
3196	—	17	3	203.3						0.9					130	20	41	38	70	44	94					8,835				
									0.1	2.5							41	38	70	41						23,875				HOURLY SUMMARY
3196	13	13	3	204.1						0.8					130	20					94					6,115				
	23	10	2	204.2					0.1						85	38					71									
	55	32	3	206.0						1.8					130	20					94					17,760				
3197	—	5	2	206.0											80	30	40	38	70	44	75									
									0.1	2.6							40	38	70	44						23,875				HOURLY SUMMARY
3197	05	5	2	206.1					0.1						85	38					70									
	37	32	3	208.0						1.9					125	22					94					17,920				
	48	11	2	208.0											90	42					71									
3198	—	12	3	208.6						0.6					130	22	42	38	70	44	92					6,300				
									0.1	2.5							42	38	70	44						24,220				HOURLY SUMMARY
3198	11	11	3	209.2						0.6					140	20					92					1,320				
	24	18	2	209.3					0.1						90	45	45				71									
	40	16	3	210.3						1.0					140	22	49	40			94					10,800				
	55	15	2	210.3											90	45	50				71									
3199	—	5	3	210.6						0.3					130	22	51	42	70	44	90					2,775				
									0.1	1.9							49	40	70	44						14,895				HOURLY SUMMARY
3199	08	8	3	211.1						0.5					120	22	50				94					4,520				
	25	17	2	211.2					0.1						90	45	57	45			71									
	37	12	3	211.9						0.7					140	25	58				94					7,020				
	58	21	2	212.0					0.1						90	48	60				71									
3200	—	2	3	212.2						0.2					120	26	60	44	70	44	85					1,240				
									0.2	1.4							58	44	70	44						12,780				HOURLY SUMMARY
3200	08	8	3	212.7						0.5					140	22	62				95					4,320				
	34	26	2	212.8					0.1						90	50	65				71									
	42	8	3	213.3						0.5					120	25	66				95					4,880				
3201	—	18	2	213.4					0.1						85	50	68	44	70	44	71									
									0.2	1.0							65	44	70	44						9,260				HOURLY SUMMARY
3201	14	14	2	213.6					0.2						90	22	69				71									
	22	8	3	214.0						0.4					125	28	70				95					4,900				
3202	—	38	2	214.2					0.2						80	58	71	46	70	45	71									
									0.4	0.4							70	46	70	45						4,900				HOURLY SUMMARY

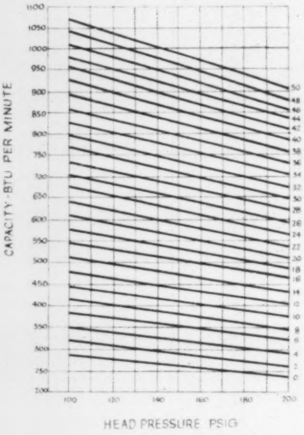


Fig. 13—Sample calibration curve, heating capacity with one compressor operating

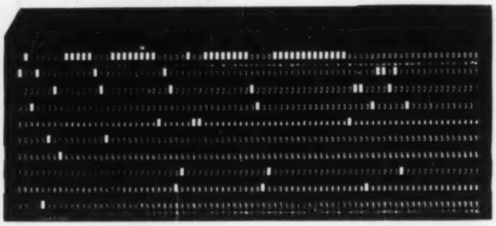


Fig. 14—Summary of one hour's operating data

where there is a detectable change from preceding readings.

The treatment of the Btu per hour capacity of the system needs some explanation. In accordance with the *AEIC-EEI* code, the heat pump can be calibrated in terms of the discharge and suction pressures and temperatures. It has been the authors' experience that a liquid-suction heat exchanger in the system will maintain the suction temperature so nearly constant that this variable may be neglected. Hence a calibration may be presented, as in Fig. 13, for one mode of operation, for total capacity related to discharge and suction pressure. Similar figures are made for the other modes of operation. With these calibrations capacity data can be entered on the log sheet.

A feature of the testing method is the use of hourly summaries. Due to the *on-off* operation of the heat pump it is necessary, for each hour, to determine separately the kilowatthours for each mode, and also the corresponding Btu produced. Average temperatures for the hour are readily determined. These hourly summaries are then recorded as punched holes in business machine cards, as shown in Fig. 14. On this card the following data are included: installation number; hour; total kilowatthours consumed by heat pump; kilowatthours consumed by defrosting heater; kilowatthours on each operating mode; average outdoor dry bulb; average outdoor dew point; average indoor dry bulb; average indoor dew point; water temperature in (if used); water temperature out (if used); Btu delivered at each mode; complete history of cyclic operation for the hour.

The final step is to utilize these cards to obtain performance correlations between various factors. For instance, with a group of these cards covering a long period of operation, the following can be calculated by automatic business machines: *a.* CP for each operating step *vs.* outdoor conditions; *b.* performance factor; *c.* kilowatthours *vs.* degree days; *d.* load factor *vs.* time; *e.* relation between recorded outdoor conditions and records of nearest weather station; *f.* frequency of operation of various steps at different conditions; *g.* frequency of defrosting and required power consumption at all climate conditions; *h.* correlation of factors affecting building heat loss; *i.* relation between electrical demand and outdoor temperature and humidity; *j.* heating/cooling ratio *vs.* various climate parameters; and *k.* correspondence with analytical methods of predicting performance.

Conclusions

This paper has presented methods for evaluating heat pump performance, both analytically and experimentally. Its nature does not permit the usual quantitative conclusions. However, the following indicate general results:

1. It *is* possible to predict the performance of a heat pump system. This is true even in an air-to-air type heat pump which seeks a new set of operating conditions for each variation of external conditions. Although a complete analysis of the latter is somewhat complex, this kind of treatment is certainly justified in the design of a packaged heat pump which is to be manufactured in quantity and applied under widely differing conditions.
2. Accurately-taken test data are needed to supplement performance analysis. It is particularly important in field testing to obtain sufficient data to provide an accurate indication of *actual* performance—rather than to take only cursory measurements that do not yield true performance.
3. Contrary to common belief, the use of outdoor air as a source of heat for the heat pump is suitable in other than extremely mild climates. The performance analysis methods that have been presented illustrate a representative climate and show that, if supplementary heat can be made available for the relatively short periods of extremely low temperatures, the air-source heat pump can do an excellent heating job at reasonable economy.
4. The advent of the heat pump requires additional consideration of the factors of weather and building construction and their relation to heating capacity required. It appears evident that new methods must be formulated for determining required heating capacity. Such factors as heat lag and thermal storage in buildings need consideration. These methods may well be based upon the system of analysis presented here.

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3. Technical Regional Report—Climate Control Project sponsored by House Beautiful, Dr. Paul Siple, chief climatologist.
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Night-Air Cooling

By F. E. Giesecke,* New Braunfels, Tex.

SUMMARY — The purpose of this paper is to show that night-air cooling can be applied economically to commercial and industrial buildings, as well as to residences. The author describes the example of a bank building which used night-air cooling during the summer of 1949. According to the data presented, the cost of this form of cooling should be less than one-half the cost of mechanical refrigeration.

In localities where the night-air temperature is considerably lower than the day-air temperature, it may be economical to use night-air for cooling.

For the San Antonio, Tex., area, records of the U.S. Weather Bureau give the following data (Fig. 1):

	Avg. Minimum Daily Temp. F deg	Av. Maximum Daily Temp. F deg
July 1948	75.2	93.6
Sept. 1948	67.9	86.6

Assuming that in buildings in the San Antonio, Tex., area which are air conditioned during the day, the maximum night-air temperature will be 80 F, it will be possible to exhaust 80 F air and replace it with 75 F air in July and with 68 F air in September and thereby effect considerable cooling in the San Antonio, Tex., area. In buildings which are not air conditioned, the maximum night-air temperature will be considerably higher than 80 F and the benefits that can be secured with night-air cooling will be correspondingly greater than in air conditioned buildings.

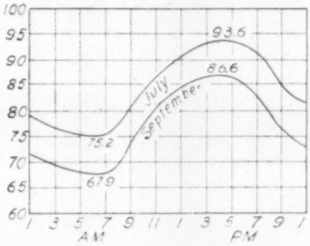

Fig. 1—Average daily temperatures during July and September, 1948 as recorded by the U. S. Weather Bureau at San Antonio, Tex.

For a number of years, the author has used night-air cooling in his residence by leaving the windows open during the night, so that the contents of the building and the building structure could cool, and then keeping the windows and blinds closed during the day so as to exclude heat as much as possible. As a result, the indoor air temperature during the afternoon was from 10 to 15 deg lower than the corresponding outdoor air temperature. This degree of cooling produces fairly comfortable conditions within the building at practically no cost.

During the summer of 1949 the author had the opportunity of using night-air cooling in the building (Fig. 2) of the First National Bank of New Braunfels, Tex. The banking room is 44 × 46 ft and 20 ft high; its volume is about 40,500 cu ft and the surface area of walls, floor, and ceiling is about 7600 sq ft.

In 1931, at the time of its construction, the building was equipped with a forced warm-air heating system, which included a centrifugal fan belted to a 5 hp, 1800 rpm, 220 volt motor so as to drive the fan at 648 rpm, and to deliver air at the rate of about 9000 cfm. The air was delivered to the banking room through ceiling outlets.

During the spring of 1949 the bank building was equipped with a 15 hp air conditioning system but the 5 hp fan for the heating system was left in the building. The duct connections were changed so that the fan could draw the warm air out of the banking room through the ceiling openings and discharge it outside of the building through the duct, which is used as the fresh-air inlet during the day. As the warm air was drawn out of the room it was replaced by cool outdoor air entering through windows opened for that purpose.

Fig. 2—First National Bank Building in New Braunfels, Tex.

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*Consulting Engineer and past president and Life Member of ASHVE.

For presentation at the 56th Annual Meeting of the American Society of Heating and Ventilating Engineers, Dallas, Tex., January 1950.

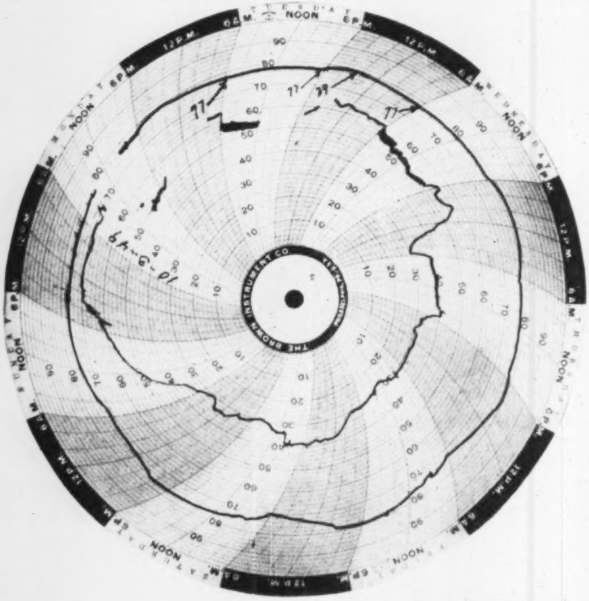

Fig. 3—Indoor air temperatures, at floor level, during the week beginning September 26, 1949

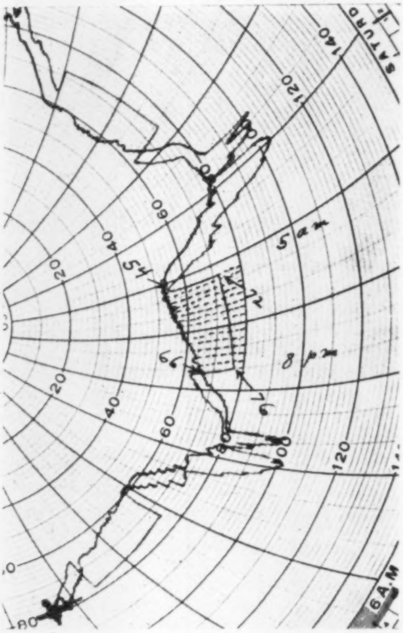

Fig. 4—Temperatures of exhaust air and make-up during night-air cooling

Since the officials of the bank desired to maintain the air temperature at about 78 F during working hours, it was decided, after some experimenting, to operate the air conditioning system from about 7 a.m. to about 5 p.m. and the night-air cooling system from about 9:30 p.m. to about 6:30 a.m.

Reduction of Temperature By Night-Air Cooling

The resulting temperatures for the week beginning September 26, 1949 are shown in Fig. 3. It will be seen that, on Tuesday, September 27, the temperature was about 77 F during the working hours. When the air conditioning unit was turned off (at about 5:00 p.m.) the temperature rose to about 79 F and then, when the night-air cooling system was turned on (at about 9:30 p.m.) the temperature gradually fell to 77 F and was then maintained at that temperature by the air conditioning unit during the working hours of Wednesday. After that, the same order of operation was repeated.

The temperatures shown in Fig. 3 are those of the air about 6 in. above the floor because the recording thermometer was placed on the floor. Near the room ceiling the air temperature was no doubt a few degrees higher.

It may seem strange that the indoor air temperature should rise 2 deg from 5:00 p.m. to 10:00 p.m. when there was no heat producing appliance in the building. The explanation is quite simple. When a room is air conditioned, the air in the room is cooled and the cool air, in turn, cools the inclosing walls, floor, and ceiling, as well as the persons, furniture, etc. in the room. It follows that, so long as the walls etc. are being cooled by the air, the walls are warmer than the air and that as soon as the air conditioning system ceases to function, the air begins to be heated by the walls, ceiling, and floor. For example, if the surface temperature of the walls, floor, and ceiling is 2 deg higher than the temperature of the room air and if the film coefficient is 1.65 and the surface area of the walls, floor, and ceiling is, together, 7600 sq ft, heat will be delivered to the room by those surfaces at the rate of about 25,000 Btu per hr.

To determine the amount and the cost of the night-air cooling it was found that the fan draws 17 amp of 220 volt current and removes warm air at the rate of about 6000 cfm.

The difference between the 6000 cfm moved and the 9000 cfm originally contemplated is probably the result of having more friction in the long and complicated duct system than the estimated friction.

Cooling Costs

Electric current costs the bank about 2 cents per kwhr, hence the cost of moving 6000 cfm is 17 × 220 × 0.002 or 7.48 cents per hour. If the difference between the temperature of the warm air drawn out of the building and that of the cool air replacing it is 10 deg, the quantity of heat removed from the building is

$$6000 \times 60 \times 0.075 \times 0.24 \times 10$$

or 64,000 Btu per hour. Since it costs 7.48 cents per hour to remove 64,800 Btu per hour, the current cost per ton is

$$7.48 \times 12{,}000/64{,}800,$$

or 1.39 cents per hour (if the current costs 2 cents per kwhr).

The difference between the temperature of the air drawn out of the building and the temperature of the air replacing it was determined by a two-pen recording thermometer. This was placed outside the building so that the instrument was about 6 ft above the ground and 2 ft from the building; the temperature bulb was about 6 in. above the ground and in front of the lower part of the louver through which the air was blown out of the building.

The records made by the two pens are shown in Fig. 4. In the record for Friday night, it appears that the fan came on at 8:00 p.m. and exhausted air at 76 F; also that the fan went off at 5:00 a.m. when the exhaust air had a temperature of 72 F. At the same periods the outdoor air temperatures were, respectively, 66 F and 54 F, so the average difference between the exhaust and outdoor air temperatures was 14 deg and the cost of cooling was at the rate of 1.39 × 10/14 or 0.99 cents per ton per hour during Friday night.

However, while the chart of Fig. 4 shows the temperature of the exhaust air to vary from 76 F to 72 F, the chart of Fig. 3 shows that the indoor air temperature near the floor was practically 80 F during every night and hence the air temperature at the ceiling must certainly have been at least 80 F.

An explanation of this difference between the two charts is that the exhaust air came out of the louver with such a velocity that it carried outdoor air with it and the temperature bulb measured the temperature of a mixture of exhaust air and outdoor air. At 8:00 p.m. about 71 percent of the mixture might be exhaust air and 29 percent, outdoor air. At 5:00 a.m. about 69 percent of the mixture is exhaust air and 31 percent, outdoor air.

If it is assumed that the exhaust air had a temperature of 80 F instead of from 76 F to 72 F as shown in Fig. 4, the cost of cooling is reduced to 0.99 × 14/20, or about 0.70 cents per ton per hour or, for the 9-hour period of Friday night, about 63 cents for electric current.

Conclusions

Granting that the calculations used in this paper are approximations and are based on a single set of observations, it has been shown that night-air cooling can be applied economically to commercial and industrial buildings as well as to residences.

According to the data presented here, if the cost of mechanical refrigeration in small units is about 1 kw per ton, the cost of night-air cooling should be less than one-half the cost of mechanical refrigeration.

Night-air cooling can evidently not be used in localities where the outdoor air contains dust or other objectionable materials in such amounts that it would be detrimental to pass large quantities of air through the building.

ISSUES BOOKLET ON SHIP DEHUMIDIFICATION

A paper originally published in the Journal of the American Society of Naval Engineers, Inc., has now been issued as a pamphlet under the title *Practical Ship Dehumidification—The Effect of Water Vapor Diffusion and Adsorption* by A. S. Gates, Jr. This report describes tests made on vessels which carried pilot models of dehumidifiers. Illustrations and charts are included.

AIR POLLUTION SYMPOSIUM HELD IN PASADENA

Problems in eliminating smog were discussed during the National Air Pollution Symposium held at Pasadena, Calif. November 10-11, 1949 under the sponsorship of the Stanford Research Institute, California Institute of Technology and the University of Southern California.

Among the statements made at the Symposium were the following: About $1,500,000,000 a year are lost in the United States through air pollution or smog. About $100,000,000 a year are being spent in efforts to control air contamination. Eight different substances combine their effects to cause the eye irritant which is present in the air in the Los Angeles area. These substances are: aldehydes, ammonia, sulfur dioxide, sulfur trioxide, oxides of nitrogen, ozone, carbon particles, and oil.

Among the speakers were: L. C. McCabe, Washington, D. C., who spoke at a luncheon on the first day of the Symposium. Other speakers included: G. P. Larson, present director of the Los Angeles County Smog District; A. O. Beckman, president of the National Technical Laboratories of South Pasadena; H. H. Barnes of the Chamber of Commerce; W. D. Crozier, research physicist, New Mexico School of Mines; B. K. Seely also of the New Mexico School of Mines; Leslie Silverman of the Harvard School of Public Health, Harvard University; W. T. Sproull, research director for the Western Precipitation Corp.; H. W. Washburn and R. R. Austin of the Consolidated Engineering Corp.

P. L. Magill of the Stanford Research Institute spoke on the techniques employed in the analysis of Los Angeles smog. Other speakers were V. J. Schaefer of the General Electric Laboratories; Bernard Vonnegut also of the General Electric Laboratories; V. K. La Mer, Columbia University; F. T. Gucker, Indiana University; R. T. Johnstone, M.D.; John A. Zapp, Jr.; W. B. Gibson, Stanford Research Institute.

JOURNAL SECTION

TEXAS SAYS "HOWDY"!

TO MEMBERS ATTENDING 56th ANNUAL MEETING

January 23-26, 1950

Hotel Adolphus and Baker Hotel, Dallas

SOUTHWEST AIR CONDITIONING EXPOSITION

AGRICULTURE
POULTRY

Agriculture and Poultry Buildings, Fair Park, Dallas

Method of Choosing Location of, Financing and Conducting Meetings of the Society

Resolved: That inasmuch as the Annual and Semi-Annual Meetings of the Society come under the jurisdiction of the Council, the following rules governing the handling of such meetings be adopted by the Council and published in the JOURNAL of the Society at least twice during every year, preferably just prior to each meeting.

1—The Council will select the city in which the Annual or Semi-Annual Meeting is to be held, giving due consideration to the invitations received from Chapters or members as well as to the advisability of so distributing those meetings as to make them of the greatest advantage to the general membership, and to reduce as far as possible the expense of members attending.

2—That an appropriation be made to cover the entertainment or local expenses, incurred in connection with the meeting, not exceeding $500.00, the regular meeting expense to be taken care of by the General Fund of the Society in the regular way.

3—That no registration fee or compulsory obligations of any nature be imposed on members or guests.

4—That the purchase of tickets for banquets or for any other form of entertainment that may be provided be entirely voluntary.

5—That the grouping of features and the sale of tickets for group features be discouraged.

6—That the raising of funds from manufacturers of heating apparatus be discouraged.

7—That the display of samples, or of literature, advertising the product of any manufacturer in any way, shape or form, be not permitted at the booths, registration desk, or in or about the meetings.

8—That the distribution of trade papers be entirely at the discretion of the committee in charge.

9—That the local Chapter or local members be empowered to form a General Committee with such sub-committees as may be required to handle the details of transportation, hotel accommodations, entertainment, finance, etc., and that this General Committee be requested to confer frequently with the Council, through the Secretary of the Society, and to make frequent reports on progress in connection with the various matters being handled by them.

10—That the arrangements of elaborate and costly entertainment features be discouraged.

Adopted at Council Meeting, January 29, 1926.

Summary of Chapter Meetings*

• **ATLANTA**—October 10, 1949. *Panel and Radiant Heating* and *Application of Heat Pump in Residences* were two topics discussed by Carl F. Boester, member of ASHVE Council, and housing consultant, Purdue Research Foundation, Purdue University, Lafayette, Ind., in an address given before a record attendance of 73 chapter members and guests. A report was made by F. W. Bull, treasurer. A nominating committee was appointed by Pres. Leo Sudderth, Jr. Attendance 73.

• **CENTRAL NEW YORK CHAPTER**—November 2, 1949. Experiments in physiological reactions to environment were described by Dr. W. J. McConnell of the Metropolitan Life Insurance Co., New York, who spoke at the November meeting in Syracuse. Dr. McConnell traced the development of the temperature chart and pointed out the hazards of high temperatures and the upper limits of heat for men at work. Air sterilization, the use of glycols, and the control of industrial gases and fumes were discussed. Attendance 49.

• **CINCINNATI**—November 2, 1949. This meeting began in the afternoon with two inspection tours: (1) the new Terrace Plaza Hotel, with emphasis on the fan room and the engine room; (2) the Cincinnati Gardens Ice Arena. Members also gathered for a dinner meeting at 7:30 p.m., but no official business was conducted. The group witnessed the American League hockey game. Attendance 70. Attendance ratio 0.66.

• **CONNECTICUT**—November 10, 1949. The speaker at the November meeting of the chapter in Bridgeport was Carl F. Boester, Lafayette, Ind. His subject was the *Application of the Heat Pump in Residences.*

Following a report by the chairman of the membership committee, it was announced that the next meeting would be January 12, 1950 in New Haven. Attendance 58. Attendance ratio 0.32.

• **DELTA**—November 8, 1949. At the regular dinner meeting held in New Orleans, the speaker of the evening was H. W. Broadwell, district sales manager, York Corp., Houston, Tex. Mr. Broadwell gave a talk on the *Developments in Air Conditioning.*

J. S. Burke was elected chapter delegate and Walter Cooke alternate. Pres. R. B. Guest read a letter from E. L. Crosby, president of the new Baltimore Chapter. He expressed appreciation for the Delta Chapter's previous letter of welcome. F. D. Graham introduced the speaker. Attendance 37. Attendance ratio 0.33.

• **GOLDEN GATE**—November 3, 1949. *Commercial Applications of the Heat Pump* were discussed by J. Donald Kroeker, Portland, Ore., member of ASHVE Council, at the meeting held in San Francisco. Mr. Kroeker discussed three large installations and their features and operating results. Slides were shown depicting actual equipment and schematic flow circuits.

J. Donald Kroeker
Portland, Ore.

A letter from the City College of San Francisco regarding technical speakers in the Bay Area was read. A nominating committee was appointed with James Gayner as chairman. D. L. Williams spoke regarding the *ASRE.* Attendance 95.

• **ILLINOIS**—November 14, 1949. *Practical Selection of Cooling Coils* was discussed by H. C. Rooks, The Trane Co., La Crosse, Wis., at the November meeting held in Chicago. Mr. Rooks described cooling coil selection, construction and application. He pointed out the various types, such as finned and plate type, and explained the variations in capacities under changing conditions in each. He also discussed the coils from the water side based on cleanability, drainability, and removability.

Pres. J. S. Kearney presided over the meeting and read a note from Mrs. John Howatt concerning her husband's recent death. Reports were given by the following committee members: H. E. Anderson—membership and J. H. Clarke—program. Out-of-town guests, including an instructor and a number of students from the University of Notre Dame, were introduced by Fred Kaiser.

Life Membership certificates were presented to L. T. Braun, E. P. Heckel and A. B. Martin. Attendance 141. Attendance ratio 0.29.

• **INDIANA**—September 30, 1949. Engineering and plant construction in South America were among the topics discussed by W. A. Hanley at the meeting held in Indianapolis. Mr. Hanley, who is director of engineering, Eli Lilly Co., described his trip to the Virgin Islands and Brazil, stating that south of the equator hydroelectric power is almost exclusively used, due to the absence of other energy sources. He also pointed out other engineering problems pertaining to plant construction. Pres. W. R. Fenstermaker spoke briefly at the conclusion of Mr. Hanley's talk.

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*Note: The attendance ratios shown represent the membership attendance divided by the chapter membership. These ratios will be useful as a partial indication of interest shown by local chapter members in various types of subjects programmed by the various chapters and may be useful in deciding on subjects for chapter meetings.

Representatives of the Student Branch of Purdue University were visitors at this meeting.

• **IOWA**—November 8, 1949. Following the dinner meeting held in Des Moines, Ia., members of the Iowa Chapter were conducted on a tour of inspection of the Delavan Mfg. Co., Des Moines. During the tour, manufacturing steps for oil burner nozzles were observed.

A talk on oil burners, air conditioning and other specialized applications was then given by E. O. Olson, a Chapter member. Attendance 31. Attendance ration 0.56.

• **KANSAS CITY**—October 3, 1949. The *What and Why of ASHVE Research* was the subject of the talk given by Cyril Tasker, director of research, ASHVE Research Laboratory, Cleveland, Ohio, who spoke at the meeting in Kansas City, Mo. A discussion of a future program in connection with the University of Kansas, Department of Mechanical Engineering was given by Prof. H. L. Daasch.

W. K. Dyer, chairman of the student branch committee, reported that speakers have been arranged for the first three student branch meetings and that the first speaker would be H. A. Atwater, chief engineer, Combustion Equipment Co., Kansas City.

Reports were given by the following: W. A. Reichow—treasurer; E. E. Ralston—attendance; H. H. Lewis—membership; S. A. Durbin—entertainment; David Caleb—public relations and R. D. Hotchkiss—news letter. Introduction of the speaker was made by D. M. Allen, member of ASHVE Council. Attendance 53.

• **MANITOBA**—November 17, 1949. Medical aspects of the atomic bomb were outlined by Captain Morgan-Smith at the meeting in Winnipeg. Captain Morgan-Smith, of the Canadian Army, recently attended an army school in the United States and reported on his observations there.

Research projects of the University of Manitoba were discussed and G. C. Davis reported on the Christmas Party. Presiding officer at the meeting was A. W. Moss, president of the chapter. Attendance 16.

• **MASSACHUSETTS**—November 15, 1949. Steam absorption units were described by S. E. Vickers, senior project engineer, Eureka Williams Corp., Bloomington, Ill., who spoke before the Massachusetts Chapter in the MIT Graduate House, Cambridge, Mass. Mr. Vickers described one unit having a capacity of 10 tons producing chilled water at a temperature of 42 F with a steam consumption of 220,000 Btu per hour.

In the absence of Pres. W. H. Shipp, D. W. Blair, vice president, presided over the meeting and made several announcements including the coming joint meeting with the *ASRE* on December 8. Attendance 43. Attendance ratio 0.39.

• **MICHIGAN**—November 14, 1949. At the regular meeting of the Michigan Chapter held in Detroit,

MINNESOTA CHAPTER OPENS 1949-50 SEASON

J. F. Stafford receives "special award" from Minnesota Chapter

H. E. Gerrish, ASHVE Life Member, presents Life Membership Certificates to A. L. Sanford, W. F. Uhl and Prof. F. B. Rowley at October meeting of Minnesota Chapter

Ernest Szekely
Milwaukee, Wis.

Ernest Szekely, Milwaukee, Wis., ASHVE Treasurer, was guest speaker, giving a talk on *Design of Fans and Their Applications*. Mr. Szekely also gave a brief report on Society activities. A question and answer period followed the talk. Attendance 44.

• **MINNESOTA**—October 3, 1949. The first meeting of the 1949-50 season was held in Minneapolis. Life Membership certificates were given to W. F. Uhl, Prof. F. B. Rowley and A. L. Sanford. Presentation was made by H. E. Gerrish.

Reports were given by the following: J. E. Haines—summer meeting; G. M. Kendrick—program committee; V. E. Pearson—membership committee. J. F. Stafford received a framed copy of a photograph taken at the Summer Meeting.

A film on Heating Research Programs in England was presented as a feature of the evening. Prof. A. B. Algren acted as commentator on the film which had been prepared by the British Scientific Mission. Attendance 140.

• **MONTREAL**—October 17, 1949. L. P. Herrington, director of research, John B. Pierce Foundation, New Haven, Conn., spoke on *Temperature and Human Life* at the meeting in the Berkeley Hotel. The speaker described the conditions for comfort and the adjustment of the environment to the individual. During the business part of the meeting, T. G. Anglin, chapter treasurer, discussed the chapter's annual financial statement. Guests were introduced by Robert Clapperton. S. W. Salter, chapter president, presided. Attendance 64.

• **NORTH TEXAS**—October 10, 1949. Guest speaker at the meeting in Dallas was Cyril Tasker, Cleveland, Ohio, who spoke on the *What and Why of ASHVE Research*. Mr. Tasker also answered questions from the audience.

M. L. Brown, E. T. Gessell and T. H. Anspacher were appointed to the nominating committee. J. A. Ray, program committee chairman, reported on plans for the November and December meetings. W. R. Barbeck, chairman of the attendance committee, reported regarding the December Party. C. Rollins Gardner, general chairman, Committee on Arrangements, 56th Annual Meeting to be held January 1950 in Dallas, spoke regarding the Exposition and the Program. Attendance 81. Attendance ratio 0.45.

• **NORTHEASTERN OKLAHOMA**—November 8, 1949. *Proper Venting of Gas Designed Appliances* was the subject of the talk given by Merle Orelup at the Northeastern Oklahoma Chapter meeting held in Tulsa. New officers were elected as follows: *President*—A. D. Holmes; *Vice President*— R. F. Shoemaker; *Secretary*—J. N. Watt; *Treasurer*—F. M. Thomas; *Board of Governors*—W. C. Roads, V. W. Miles and W. R. Lee. A nominating committee was appointed consisting of R. W. Winget, E. R. Cooke and J. C. Netherton, Jr. A. D. Holmes was appointed chapter delegate to the 56th Annual Meeting and R. F. Shoemaker was appointed alternate. Attendance 33. Attendance ratio 0.47.

• **NORTHERN OHIO**—November 14, 1949. The problem of water supply was the topic for the November meeting in Cleveland. As coffee speaker, Cleveland's Commissioner of Utilities Engineering, F. J. Schwenler, discussed the demands and facilities in this area, including the expansion program now under way. He concluded his talk with a description of the laying of the new intake tunnel and crib for the Nottingham pumping station.

Aspects of the problem vital to the air conditioning industry were discussed by the main speaker of the evening, H. E. Degler, Marley Co., Kansas City, Kans., speaking on *Water-Cooling Towers as Related to Water Conservation*.

At a time when the demand for water is steadily increasing, serious inroads are being made on many natural sources of water for cooling purposes in power plants, chemical plants and air conditioning installations; levels of underground sources are being reduced and, in some areas, are being contaminated by sea water. In certain cities the demand rate for water during summer hours is as much as $4\frac{1}{2}$ times the yearly average demand rate, showing the extent of standby equipment required. Mr. Degler also discussed various types of water cooling equipment with regard to selection, performance and cost.

W. M. Rowe and D. E. Mannen were elected, respectively as chapter delegate and alternate to the 56th Annual Meeting. R. L. Byers, president, announced the appointment of C. M. Humphreys to the CTSC Committee on Vocational Guidance.

R. D. Dickson, program chairman, announced that H. F. Hebley, of the Pittsburgh Consolidation Coal Co., will speak at the December 12 meeting on a subject of current concern to Cleveland, *Atmospheric Pollution*. Attendance 72. Attendance ratio 0.22.

• **OKLAHOMA**—November 14, 1949. *Air Conditioning Control Problems on Transcontinental Railways* was the subject of the talk given by C. M. Sanders, Jr., western manager, Transportation Div., Minneapolis-Honeywell Regulator Co., Minneapolis, at the meeting in Oklahoma City. No other business was taken up during this meeting. Attendance 29. Attendance ratio 0.57.

• **ONTARIO** — November 8, 1949. *Toronto's New Anti-Smoke By-Law* was the subject of the talk given by W. J. Longeway at the November meeting held in Toronto. Mr. Longeway is chief engineer of the Queen Elizabeth Hospital in Toronto.

N. W. Kingsland was appointed as chairman of the *On to Dallas* Committee. It was announced that arrangements have been made to obtain two railroad cars for members to travel to Dallas by rail. Members of three Canadian chapters have been contacted. Pres. A. J. Strain announced that J. H. Fox would be general chairman of the summer meeting in Muskoka Lakes.

The death of chapter member H. A. Baxter, was regretfully announced. Attendance 108. Attendance ratio 0.40.

• **OREGON** — November 3, 1949. Speaker of the evening at the November meeting held in Portland was Walter Hanthorn who spoke on city codes. W. C. Baker, associate professor mechanical engineering, Oregon State College, Corvallis reported on the heating and ventilating courses given by the College. Presiding officer was Pres. J. P. McDermott. Nineteen students of the Oregon State College were present as visitors. Attendance 74.

• **OREGON**—October 6, 1949. *Earth's Energy Sources* was the subject of a talk given by Dean Gleason at the meeting held in Portland. A number of business matters were also taken up. A report by a representative of the Oregon Technical Council, W. B. Morrison, discussed state architecture and engineering. Also reported on was a letter from the Research Laboratory regarding the Chapter's inquiry about research. R. C. Chewning presided over the meeting. Attendance 69.

• **PACIFIC NORTHWEST**—November 8, 1949. The November meeting, a joint one held with the *ASRE*, was called to order in Seattle with C. L. Hall, chairman of *ASRE*, presiding. Guest speaker was R. J. Thompson, director of sales of Kinetic Chemicals, Wilmington, Del., who spoke on *The History of Freon*. He described the use of this gas in refrigeration and as a propellant in aerosol products. The meeting was in charge of W. E. Stone, program chairman of *ASRE*. Attendance 92. Attendance ratio 0.38.

• **PACIFIC NORTHWEST**—October 11, 1949. The first meeting of the 1949-50 season featured a talk by J. W. May, technical director, Air Filter Division, American Air Filter Co., Louisville, Ky. A talk was also given by Prof. E. O. Eastwood, University of Washington and Past President of ASHVE. H. M. Hendrickson, formerly of California and now teaching at the University of Washington, was introduced by J. D. Sparks, chapter president.

The following were appointed: *Board of Governors*—S. D. Peterson, R. D. Morse; *membership committee*—H. F. Warren.

C. A. Pangborn, program chairman, announced that the November meeting would be a joint one with the *ASRE* and that the December meeting would be an *oldtimers'* meeting with E. L. Weber as program chairman. Attendance 65. Attendance ratio 0.44.

• **PHILADELPHIA** — November 10, 1949. Dr. A. D. Brandt, industrial hygiene engineer, Bethlehem Steel Co., Bethlehem, Pa., was the guest speaker at the November meeting which was presided over by Pres. F. H. Buzzard. Dr. Brandt spoke on the subject, *Engineers' Responsibility for Air Sanitation in Industry*. Attendance 70. Attendance ratio 0.27.

• **PITTSBURGH**—November 14, 1949. L. E. Seeley, Durham, N. H., second vice president of ASHVE, was the guest speaker at the November meeting, his subject being *Humidity and Its Value*. Dean Seeley showed the value of humidity as related to the human body and after his talk answered many questions.

Reports were given as follows: B. B. Reilly—treasurer's report; C. M. Fife—membership; R. J. Doherty—attendance; C. H. Schneider—chapter delegates; D. W. Loucks—promotion of research; A. F. Metzger—programs for future meetings.

Dean L. E. Seeley
Durham, N. H.

L. N. Hunter, chairman of the ASHVE Committee on Research, was also present and spoke about the work of the Research Committee. Attendance 36.

• **ROCKY MOUNTAIN** — November 2, 1949. The Rocky Mountain Chapter meeting was held in Englewood, Colo., with B. A. Brickham, heating and ventilating engineer, Denver, Colo., speaking on the subject, *Engineering for Salesmen*. Mr. Brickham described how layouts of various heating systems were made and also explained the functions of the various valves, traps and pumps. At the conclusion of the talk, members decided that Mr. Brickham should continue this series at the next meeting, at which time the subjects would be *Forced Warm Air Heating* and *Panel Heating*.

R. W. Petersen, of the program committee, reported on future programs. P. W. Young gave a report on research problems of the Denver University staff and the staff of the Industrial Hygiene Department of the University of Colorado Medical School. H. L. Wray reported on the status of various codes now under consideration by the City Council.

Attendance 42. Attendance ratio 0.38.

• **ST. LOUIS**—October 11, 1949. New practices in heating were described by Carl F. Boester, Lafayette, Ind. Mr. Boester described projects going on at the University of Illinois, the University of Cincinnati and Purdue University. At the University of Illinois, experimentation is going on regarding heating with warm air circulation through cavities in walls and/or floors. The warm air application of the heat pump was also emphasized and the *House of the Future* studied by Dr. C. A. Mills was described. Mr. Boester described trends in residential hot water panel heating and also told about the ground source heat pump being studied at the Small House Research Bureau of Purdue University.

W. P. Norris, district engineer, Baker Refrigeration Corp., gave a review on a recent paper from the ASHVE JOURNAL SECTION, *Heating Gains are not Cooling Loads*, by C. O. Mackey and N. R. Gay.

Carl F. Boester
Lafayette, Ind.

The past presidents were introduced by G. W. F. Myers, also a past president, as follows: B. L. Evans, J. H. Carter, B. C. Simons, G. B. Rodenheiser, Carl F. Boester, M. F. Carlock, D. J. Fagin, C. E. Hartwein, E. E. Carlson, C. R. Davis, J. W. Cooper, L. W. Moon, W. A. Klein and W. C. B. Sodemann. Mr. Sodemann reviewed the past 27 years regarding the chapter and the developments in heating and ventilating.

J. H. Carter, chapter representative to the Joint Council of Engineers, was announced as having been appointed chairman of the public affairs committee of that group. Attendance 65.

• **SHREVEPORT** — November 17, 1949. At the November meeting in Shreveport, La., the following officers for 1949-50 were elected: B. E. Segall, Jr., *president*; S. W. Beaty, *vice president*; R. M. Hood, *secretary*; W. S. Evans, *treasurer*; B. E. Segall, Jr., R. M. Hood, A. H. Otto, W. E. FitzGerald, S. W. Beaty, W. S. Evans and P. O. Rottmann, *board of governors*.

Speaker of the evening was E. N. Henderson, general engineering department, Arkansas Natural Gas Companies, who spoke on *Making Natural Gas Available for John Q.* Attendance 24.

• **SOUTH TEXAS**—October 12, 1949. Some of the highlights of the current work being done at the Research Laboratory were given by Cyril Tasker, Cleveland, who spoke before the October meeting in Houston. Some of the accomplishments of the Laboratory during the past 30 years were also pointed out.

During the business part of the meeting, reports were given by: Sidney Bromberg—chapter membership; C. L. Fleming—treasurer's report; and H. L. DeVines—chapter publication. Introduction of the guest speaker was made by Reg. F. Taylor. Attendance 64. Attendance ratio 0.26.

• **SOUTHWEST TEXAS**—November 22, 1949. At the annual meeting in San Antonio the following officers for the coming year were elected: L. S. Pawkett—*president*; I. W. Wilke—*vice president*; W. E. Long—*secretary-treasurer*. Mr. Wilke, the new vice president, was elected as chapter delegate, with A. J. Rummel as alternate.

Three speakers representing the City of San Antonio presented the views of three departments as follows: Bert Calvin, San Antonio Builders Inspection Division—provisions of the city code; V. T. Mayhan, Electric Inspection Department — requirements in the installation of heating and air conditioning equipment; Marvin Uecker, Fire Prevention Bureau—suggestions regarding the prevention of fires.

The date of the annual meeting of the Southwest Texas Chapter with the Texas A & M Student Branch was announced as December 13, 1949 to be held at Bryan, Texas. A social meeting for December 16 was also discussed. Attendance 26.

• **VIRGINIA**—November 2, 1949. A hamburger and hot dog supper was enjoyed by members at the home of F. R. Ervin in Norfolk. Speaker of the evening was Mr. McCorkhill of McCorkhill Associates, Arlington, Va., who spoke about centrifugal pumps. Members were named to serve on the following committees: *auditing*—R. P. Atkinson, J. E. Harding and J. J. Shanahan; *nominating committee*—W. P. Robinson, F. R. Ervin, T. A. Lambert, Laurence Trant, D. E. Phillips; J. E. White was elected chapter delegate. The next meeting was scheduled for the first part of December. Attendance 13. Attendance ratio 0.40.

• **WESTERN MICHIGAN**—November 7, 1949. A panel discussion on radiant heating was conducted at the meeting in East Lansing, Michigan, with Dean L. G. Miller as moderator. K. E. Robinson, vice president of the chapter, announced that the next meeting would be held on December 5 and that Ernest Szekely, ASHVE treasurer, would be the speaker. Presiding officer was J. L. Alexander.

During the meeting, a discussion arose regarding the formation of a Student Branch at Michigan State College, East Lansing. Attendance 73. Attendance ratio 0.35.

• **WESTERN NEW YORK**—November 16, 1949. This meeting was a joint meeting of the Technical

Societies Council of the Niagara Frontier and the Western New York Chapter and was held in Buffalo. N. E. Strieby, Long Lines Division, American Telephone and Telegraph Co., spoke on *Television Network and Micro-Waves.* T. F. Killeen, vice president of the Chapter, presided. Attendance 30.

• **WESTERN NEW YORK**—September 27, 1949. The September meeting of the Western New York Chapter was the Annual Golf Outing held at Cherry Hill Country Club, Ontario, Canada.

• **WISCONSIN**—October 17, 1949. Advances in the use of hot water for heating were pointed out by F. C. Hackett at the October meeting held at Racine. Speaking on *Forced Hot Water Heating*, Mr. Hackett, sales promotion manager, Bell & Gossett Co., Morton Grove, Ill., discussed the methods of heating water for domestic hot water requirements used in conjunction with both hot water and steam boilers. One and two pipe forced hot water systems were described and typical pipe layouts for commercial type buildings were exhibited on slides.

Several reports were given as follows: J. R. Vernon—Semi-Annual Meeting at Minneapolis; L. C. Plaehn—future programs; N. E. Hill—publicity for the chapter; A. S. Krenz—employment. During the dinner which preceded the meeting, E. W. Gifford spoke on the duties and activities of the board of governors. Prior to the evening meeting, several members and guests were conducted on an afternoon tour through the plant and laboratory under construction at the S. C. Johnson & Sons Co. Attendance 63. Attendance ratio 0.23.

STUDENT BRANCHES

▲ **CCNY**—November 9, 1949. This meeting took place on the campus of the College of the City of New York and was devoted to business. Reports were made by the chairmen of the following committees: membership, planning and employment. There was also a report by a special committee regarding its interview with the Dean of the School of Technology.

It was announced that the meeting room difficulty previously experienced has been taken care of and that the Student Branch would meet every second Wednesday evening. The members attending the meeting also discussed plans for the remainder of the semester. Presiding officer was Norman Moskiwitz, president of the Branch. Attendance 26. Attendance ratio 0.65.

▲ **CCNY**—November 3, 1949. Visitors at this meeting held on the campus of the College of the City of New York included 39 student members of the *ASME* and *SAE*.

The heat pump was described by Michael Martus, air conditioning engineer, American Gas and Electric Co. Mr. Martus enumerated the various heat sources for the heat pump and gave an example of an installation using each source and discussed the efficiency of each system. A comparison of the cost of various fuels was also given.

A second speaker was Prof. G. J. Bishof, chairman of the Department of Mechanical Engineering, College of the City of New York, who explained the curriculum given by the Department of Mechanical Engineering. Professor Bishof also spoke about the Big Brother Committee set up in the School of Technology, whereby seniors *adopt* a number of freshmen in order to help the freshmen acclimate themselves. Attendance 77. Attendance ratio 0.95.

▲ **UNIVERSITY OF TEXAS**—October 6, 1949. The first regular meeting of the fall term was held on the campus, with Professor Dorrenburgher of the Department of Architectural Engineering of the University of Texas speaking on the cooperation between architects and engineers.

D. E. Barker announced that the Southwest Texas Chapter would meet in San Antonio on October 11 and plans were made by several student members to attend this meeting. Attendance 27.

▲ **UNIVERSITY OF TEXAS**—September 29, 1949. An organization and business meeting for the 1949-50 season was held in the Engineering Building on the campus in Austin, Tex., with Pres. D. S. Belvin presiding.

A history of the University of Texas Student Branch and its relation to the ASHVE was given by Professor W. E. Long. Attendance 28.

▲ **TEXAS A & M**—October 25, 1949. J. W. Hall, consulting engineer, Bryan, Tex., and an alumnus of Texas A & M, spoke on *Engineering and the Professional Engineer* at the meeting on the campus, College Station, Tex. It was voted to hold the annual joint meeting with the Texas and Shreveport Chapters, and R. N. Hughes, president, appointed the following joint meeting committee: F. K. Goodman, chairman, W. A. Galbreath, Jr., and W. E. Richard. Attendance 18.

▲ **TEXAS A & M**—October 11, 1949. Absorption air conditioning was discussed by Don Mayne, Lone Star Gas Co., addressing the Chapter at the meeting in College Station. A number of questions were asked the speaker at the conclusion of his talk. Visitors were Messrs. Stassen and Wall of Bryan, Tex. and Mr. Andrews of El Paso, Ill. Attendance 20. Attendance ratio 0.59.

▲ **TEXAS A & M**—October 6, 1949. The ASHVE Laboratory and the role of students in the Society were discussed by L. S. O'Bannon at the meeting in the M. E. Lecture room on the campus. New officers were elected as follows: E. Rovinsky—*treasurer*; and W. J. Bowen—*secretary.* Committees were appointed as follows: *membership*—E. Rovinsky, chairman, R. S. Lockett, and W. B. Manousos; *program*—W. Q. Scott, chairman, W. A. Galbreath, Jr., W. D. Tiner, R. S. Lockett, C. P. Howard, and R. A. Hall.

It was voted to hold the regular meetings on the second and fourth Tuesdays of each month. Attendance 23. Attendance ratio 0.88.

JOURNAL SECTION

Candidates for Membership

The Constitution of the Society, as now amended, requires the following mode of procedure in voting on applicants for membership in the Society. All applications for membership are to be sent to the Secretary and the names of applicants and their references shall be printed in the next issue of the JOURNAL of the Society or sent to the members in other approved manner as ordered by the Council. When the replies are received from references, the Candidate's application shall be submitted to and acted upon by the Committee on Admission and Advancement as soon as possible.

When the Committee on Admission and Advancement has acted favorably upon a Candidate's application and assigned his grade, the Council shall vote upon the election of the proposed Candidate for membership by letter ballot. During the past month, 166 applications for membership have been received and the names of these men and their sponsors are published in the following list.

Members are requested to scrutinize the list with care. The Committee on Admission and Advancement, and in turn, the Council, urge members to assume their share of responsibility of receiving these candidates into membership by advising the Secretary promptly of any whose eligibility for membership is in any way questioned.

All correspondence in regard to such matters is strictly confidential, and is solely for the good of the Society, which it is the duty of every member to promote.

Unless objection is made by some member by January 25, 1950, these candidates will be balloted upon by the Council. Those elected to membership will be notified by the Secretary immediately after election.

ANDERSON, C. A., Mgr., Seattle Br., Western Engineering Co., Seattle, Wash. PROPOSERS: J. B. Notkin, E. S. Constant. SECONDERS: J. D. Sparks, M. N. Musgrave.

ANDERSON, P. H., Sales Engr., Duluth Plumbing Supplies Co., Duluth, Minn. PROPOSERS: E. R. Westphal, N. E. Westphal. SECONDERS: W. R. Stockwell, C. F. Newport.

ASHENFELTER, C. B., Sales Engr., Johnson Service Co., Minneapolis, Minn. PROPOSERS: A. B. Algren, B. F. McLouth. SECONDERS: W. N. Parks, R. C. Jordan.

ATHERTON, J. M., Mech. Engr., M. J. Daly & Sons, Inc., Waterbury, Conn. PROPOSERS: R. C. Atherton, W. A. Johnson. SECONDERS: Curtiss L'Hommedieu, P. J. Lamoureux.

BALLARD, E. E., JR., Sales Engr., American Blower Corp., Milwaukee, Wis. PROPOSERS: I. J. Rossiter, E. C. Youngman. SECONDERS: J. R. Vernon, I. J. Haus.

BALLARD, J. B., Vice-Pres., Sterling, Inc., Milwaukee, Wis. PROPOSERS: A. R. Podolske, K. O. Werwath. SECONDERS: B. M. Kluge, D. W. Davis, Jr.

BASS, E. L., Mgr., Tulsa Div., Water Cooling Equipment Co., Tulsa, Okla. PROPOSERS: W. R. Lee, J. W. McKenzie. SECONDERS: L. S. Gilbert, A. R. Niemoeller.

BENNETT, P. S., Engr., Harry F. Haldeman, Inc., Los Angeles, Calif. PROPOSERS: Carlyle Artran, N. N. Dahl. SECONDERS: H. P. Sheldon, H. F. Haldeman*.

BEST, J. L., Sales Engr., Johnson Service Co., Detroit, Mich. PROPOSERS: J. S. O'Gorman, Jr., F. C. Engler. SECONDERS: K. J. Wagoner, E. F. Glanz.

BEST, W. D., Pres., E. Best Plumbing & Heating Supply Co., Quincy, Ill. PROPOSERS W. L. Davis, J. D. Rosebrough. SECONDERS: E. F. Theisen*, J. W. Marion*.

BLANCHARD, J. G., Sales Engr., American Blower Corp., Cincinnati, Ohio. PROPOSERS: H. E. Sproull, C. T. Doudican. SECONDERS: K. B. Little, G. B. Houlistan.

BLOSSOM, J. S., Chief Job Engr., Mechanical Heat and Cold, Inc., Detroit, Mich. PROPOSERS: L. A. Burch, P. S. Hosman. SECONDERS: T. H. Mabley, J. R. Zynda.

BOTTGER, C. L., Sales, McDonnell & Miller, Inc., Chicago, Ill. PROPOSERS: E. N. McDonnell, N. W. Swanson. SECONDERS: J. W. James, J. A. Solon.

BOWERS, W. B., Sec'y., United States Register Co., Battle Creek, Mich. PROPOSERS: C. F. Kessler, A. B. Epple. SECONDERS: Harry Christenson, R. B. Smith.

BUMLER, M. L., Sales Engr., Norton C. Marshall Co., Detroit, Mich. PROPOSERS: D. S. Falk, G. L. Davis, Jr. SECONDERS: W. N. Witheridge, G. C. Harrold.

BURGUIÈRES, E. A., JR., Sec'y-Treas. and Gen. Mgr., Ernest Engineering, Inc. New Orleans, La. PROPOSERS: C. V. Bankston, E. O. Thoman. SECONDERS: L. V. Busenlener, R. B. Guest.

BURTON, G. W., Foreman, Heating and Sheet Metal Design Dept., Anaconda Copper Mining Co., Anaconda, Mont. PROPOSERS: T. J. Sullivan, J. C. Kelly. SECONDERS: C. A. Lemmon*, E. C. Connell*.

CAMIEL, S. B., Pres., Circulators and Devices Manufacturing Corp., New York, N. Y. PROPOSERS: D. G. Leslie, W. G. Boales. SECONDERS: W. D. Christie*, Paul Wrablica*.

CLOWER, J. D., Dist. Sales Mgr., American Coolair Corp., Whitewright, Tex. PROPOSERS: W. B. Loeffler, W. J. Way, II. SECONDERS: E. G. Floeter, Jr., G. A. Linskie.

CROKER, W. M., Owner, Arlington Heating Co., Arlington, Va. PROPOSERS: R. L. Bridgman, R. A. Grant. SECONDERS: J. K. Franklin, A. B. Devore.

CROSS, B. J., JR., Air Cond. & Refrig. Engr., Lederle Laboratories Division, American Cyanamid Co., Pearl River, N. Y. PROPOSERS: R. M. Nee, B. H. Jennings. SECONDERS: A. T. Arruzza*, J. M. Brown*.

DEANE, J. F., Engr., International Sales Co., San Francisco, Calif. PROPOSERS: T. J. White, E. C. Fanning. SECONDERS: C. L. Peterson, R. C. Cushing.

DERSHIMER, C. S., Sales Engr., J. R. Dowdell & Co., Houston, Tex. PROPOSERS: A. F. Leonard, E. E. Cravens. SECONDERS: J. N. Powell, H. D. McMillan, Jr.

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OBITUARIES

RUDOLF POLLAK

Rudolf Pollak, chief engineer at Rockefeller Center for the last 16 years, died November 6, 1949 in Roosevelt Hospital after an illness of several months. He was 62 years old. Mr. Pollak lived in New York City.

Born in Brooklyn, the son of Jacques and Mary Pollak, he was graduated in 1908 from Stevens Institute of Technology and joined the Otis Elevator Co. From 1912 to 1917 he was a construction engineer for the firm of Buxton, Cassini & Co., of Buenos Aires. He also served as an engineering agent for Otis Elevator Co. in Rio de Janeiro.

In World War I, Mr. Pollak served as a first lieutenant in the Army Transport Corps on the transatlantic supply service. Later he became a marine engineer for the United Fruit Co. From 1921 to 1925 he was chief engineer for the Panama Railroad Steamship Co. of New York.

In 1925 Mr. Pollak began a five-year association with the American Cuban Line and the American South African Line as chief engineer. He left that post in 1930 to become chief engineer in the Garment Center Capitol in New York.

When the 70-story RCA Building opened in Rockefeller Center in May, 1933, Mr. Pollak became its chief engineer. He was responsible for maintenance and mechanical equipment in all of the Center's buildings. From 1945 until his death he also held the post of chief of the Center's department of consulting engineering and design.

Besides being a member of the ASHVE, Mr. Pollak was a member of the *American Society of Mechanical Engineers, New York State Society of Professional Engineers,* and the University Club. He is survived by his widow and one sister.

WILLIAM Z. HARRISON

William Z. Harrison, a member since 1944, died on November 9, 1949, according to a communication received from the Utah Chapter.

Mr. Harrison was born in Cardington, Ohio. He was educated in public schools and received his professional training through practical experience. At the time of his death, he was owner of Harrison & Co. of Salt Lake City, Utah, a manufacturers agency for power equipment. He had been a manufacturers representative for more than 25 years.

HENRY A. BAXTER

Henry A. Baxter died at his home in Toronto, Ont., Canada, on November 7, 1949 at the age of 53. He was a member of the Ontario Chapter, ASHVE. He was born in Raphoe County, Donegal, Ireland, in 1896 and was educated in the Royal School of Raphoe. He was general manager, W. H. Cunningham & Hill, Ltd. Survivors are his wife, one son and one daughter.

ALBERT A. CRIQUI

Albert A. Criqui, 67, of Kenmore, N. Y., consulting engineer for the Buffalo Forge Co., died suddenly November 7, 1949.

Mr. Criqui was born at Harris Hill, March 3, 1882. He attended schools in Cheektowaga and was graduated from Canisius High School and Canisius College. His entire engineering career was spent with the Buffalo Forge Co. He began there in 1903 and in 1915 became chief engineer, a position he held until 1948.

Besides being a member of ASHVE, he was also a member of the *New York State Society of Professional Engineers.* He contributed many articles on special application of fans and fan designs to technical journals. He was the holder of 12 patents on high speed centrifugal fans.

Mr. Criqui, a member of the Western New York Chapter, had been elected to Life Membership this year. A sketch of Mr. Criqui appeared in the September 1949 JOURNAL SECTION. He is survived by his widow, two sons, a daughter, a brother and two sisters.

ALFRED J. EDGE

Alfred J. Edge died on October 11, 1949 at Mills Memorial Hospital, San Mateo, Calif., from a heart attack. Mr. Edge was born in 1881 in Philadelphia, Pa. and was educated in the Westtown Boarding School, Westtown, Pa. and Cornell University, Ithaca, N. Y., receiving a civil engineering degree in 1906. For one year after graduation he was also an instructor at Cornell University.

In 1907 he was associated as an engineer with Whitney-Steen Co., New York City and was engaged in building construction in New York, Connecticut, Colorado and Utah. In 1917 he became an engineer in design and construction for U. S. Rubber Co. in the New York City Laboratory and later in Sumatra D.E.I. and Penang Straits Settlements.

In 1924 he opened his own office as consulting engineer in New York City. Other experience of Mr. Edge: D. W. Alexander Co., Atlanta, Ga., Air Conditioning Corp., Savannah, Ga., Jacksonville Air Conditioning Co., Jacksonville, Fla. At the time of his death, he was a mechanical engineer in San Mateo, Calif.

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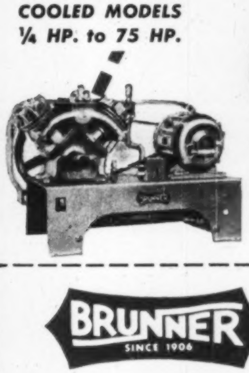
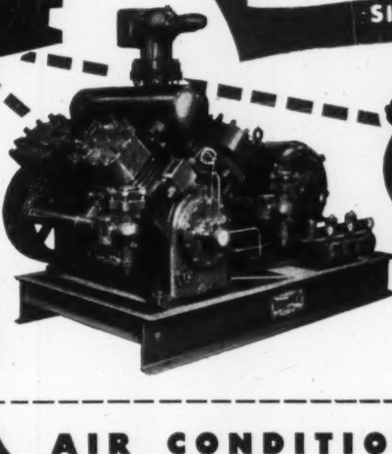
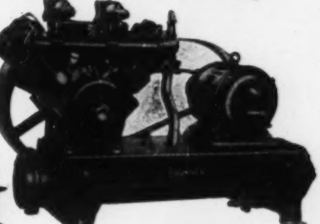






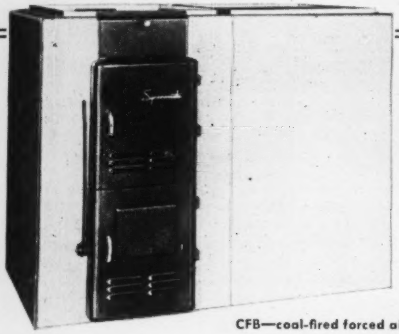
BRUNNER SINCE 1906

AIR CONDITIONING

Self Contained Units in 4 sizes: 3 - 5 - 7½ and 10 HP.
Remote Installation Types from 5 to 75 HP.

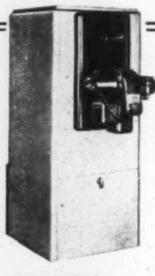
WILSON'S HAIR FILTERS and Syncromatic COUNTER FLOW for higher heating efficiency

In conjunction with its efficient Counter Flow principle of warm air heating, Syncromatic Corporation insures super-clean conditioned air by using Wilson's *Hair* Filters, Honeycomb type, in all units—coal, oil and gas. Wilson's *Hair* Filters mean more cleaned air per filter—maximum cleaning without clogging.



CFB—coal-fired forced air series
Also, coal-fired gravity furnaces

Syncromatic COUNTER FLOW



Oil-fired Hi-Boy

Gas-fired Hi-Boy

OFB—oil-fired series

The famous Edgeseal, the original *Hair* Filter with the patented self-sealing edge.

The popular Honeycomb, the dressed up *Hair* Filter that is so easy to handle.

EDGESEAL
HONEYCOMB

SAVE DELAY, DOUBT AND DOLLARS

Send for samples with details and prices today. Wilson's *Hair* Filters are another quality product made by Wilson & Co., Inc.—world-famous for superior quality in Meats, Sports Equipment, Pharmaceuticals, Hair Products, etc.

THE HAIR THAT CLEANS THE AIR
W
WILSON'S HAIR FILTER

WILSON & CO., INC., (Air Filter Division) 4100 S. Ashland Ave., Chicago 9, Ill.

INDOOR COMFORT

WILSON'S HAIR FILTER

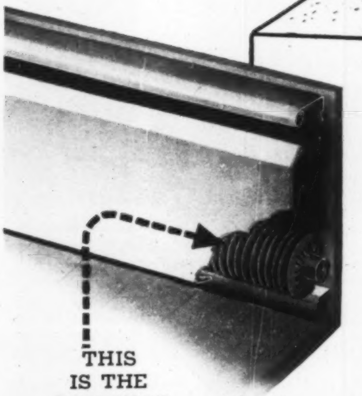
WILSON & CO.

CHECK THIS MONEY SAVING PACKAGE!!!

"FLOORLEVEL"

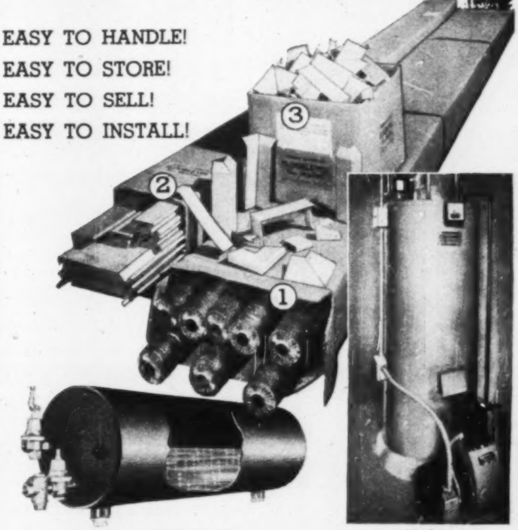
HOT WATER BASEBOARD OIL HEAT

PROFIT PACKAGE!



A COMPLETE INSTALLATION
in ONE money saving package

EASY TO HANDLE!
EASY TO STORE!
EASY TO SELL!
EASY TO INSTALL!



DE-AIRATOR TANK

"J" Series
BOILER-BURNER UNIT

The Complete Floorlevel Package is packed in 3 cartons: (1) Heating elements, (2) Baseboard front panel and top moulding, (3) All miscellaneous fittings . . . Packaged in 5 different sizes for 200, 233, 263, 300 and 333 sq. ft. radiation . . . for all size homes.

Designed for use with *either* the J-3 Boilerburner (up to 600 sq. ft. radiation) or the "T" Series (up to 1610 sq. ft. of radiation) . . . or with all other hot water heating systems.

De-Airator Tank Unit available for use with the following size installations: 500, 1000, 1500 sq. ft. of radiation.

Circulators, flow valves and controls in required sizes.

Send for SPECIFICATION 56-E

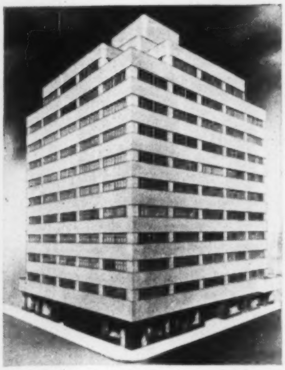
GENERAL Automatic
OIL BURNERS · HEATING EQUIPMENT

Since
1923

GENERAL Automatic

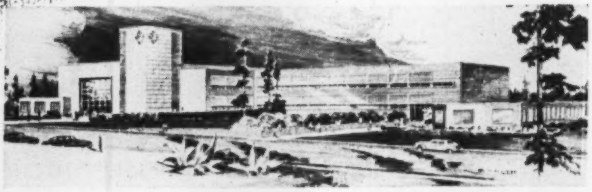
GENERAL AUTOMATIC PRODUCTS CORP. 2300 Sinclair Lane, Baltimore 13, Md.
Formerly GENERAL OIL BURNER CORPORATION

Some of the many TEXAS buildings equipped with POWERS AIR CONDITIONING CONTROL



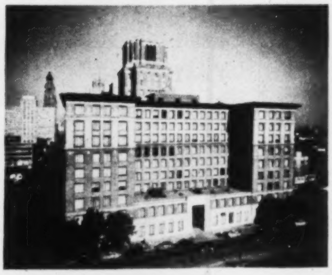
Above: **Reserve Loan Life Insurance Co. Bldg.,** Dallas

Below: **Carthage Junior-Senior High School**
Carthage



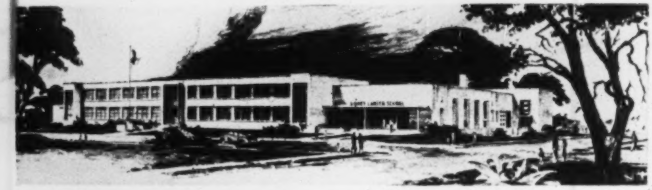
Above: **Hotel Adolphus**
Dallas

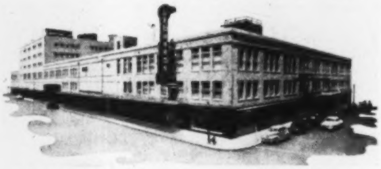
Below: **Humble Oil & Refining Co. Office Building,** Houston



Below: **Lamar Hotel**
Houston

Below: **Sidney Lanier School**
Dallas

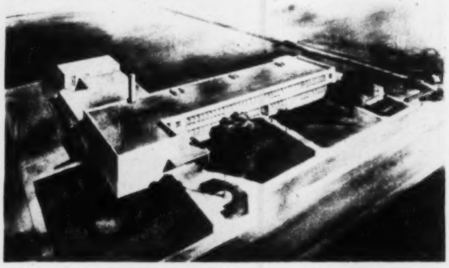




Above: **Leonard's Department Store,** Fort Worth

Left: **Rice Hotel**
Houston

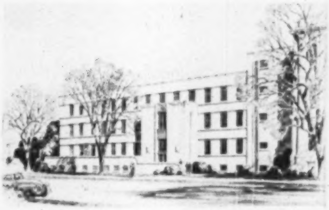
Below: **L. O. Donald Elementary School**
Dallas



Below: **Houston Chronicle Building**
Houston

Sears, Roebuck and Company
Ross and Greenville, Dallas

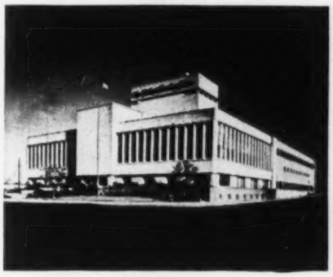
Texlite Company
Dallas



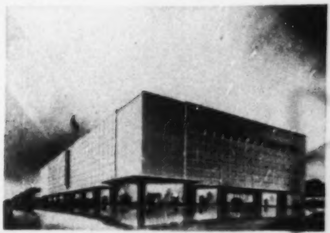
Baylor University,
College of Dentistry, Dallas

Mercantile National Bank
Dallas

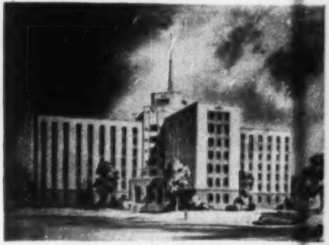
Dallas Morning News
Dallas



St. Anthony Hotel
San Antonio



Sears, Roebuck and Co.
Jefferson & Llewellyn, Dallas



George W. Truett Memorial Hospital
Dallas

Plaza Hotel, San Antonio

ACCURATE TEMPERATURE and HUMIDITY CONTROL in these prominent TEXAS buildings

is assured by the dependable operation of POWERS pneumatic control systems.

Whenever you have a problem of selecting the proper type of control for any building, take advantage of our 59 years of experience. With a wide variety of modern equipment we can supply the right control for your requirements.

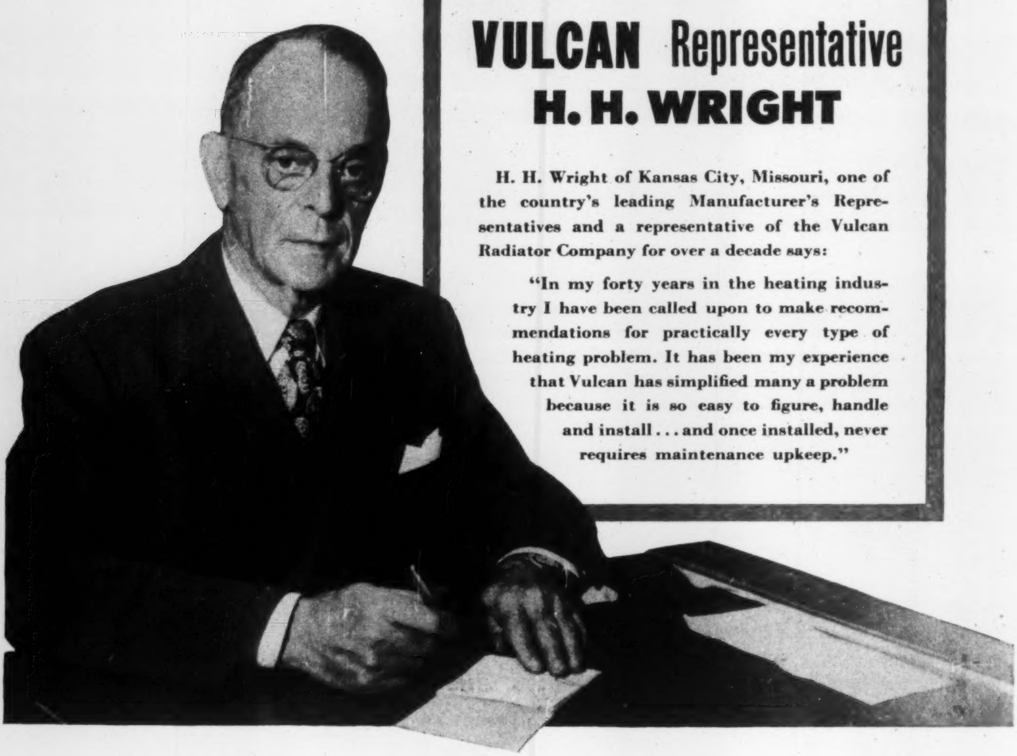
★ See Our Exhibit
Southwest
Air Conditioning
Exposition
Dallas ★ Jan., 1950

TEXAS OFFICES—Dallas, Houston
San Antonio and El Paso
CHICAGO 14, ILL.—2720 Greenview Ave.
NEW YORK 18, N.Y.—231 East 46th St.
LOS ANGELES 5, CAL.—1808 W. 8th St.
TORONTO, ONT.—195 Spadina Ave.

(TEX)

POWERS

THE POWERS REGULATOR CO. • OFFICES IN OV [illegible]



VULCAN Representative
H. H. WRIGHT

H. H. Wright of Kansas City, Missouri, one of the country's leading Manufacturer's Representatives and a representative of the Vulcan Radiator Company for over a decade says:

"In my forty years in the heating industry I have been called upon to make recommendations for practically every type of heating problem. It has been my experience that Vulcan has simplified many a problem because it is so easy to figure, handle and install . . . and once installed, never requires maintenance upkeep."

A recognized authority on Product Application in the Midwest for many years Mr. Wright has built up an efficient staff with a total service record of 85 years experience. This organization is typical of Vulcan's nationwide representation. It offers every customer a real engineering knowhow, a knowledge of product application, practical experience, and above all, *service* in the fields of residential, commercial, industrial and institutional heating.

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Albany, N. Y.	G. W. Heacock & Co., Inc.
Albuquerque, N. M.	Boyd Engineering Co.
Amarillo, Texas	Snook and Aderton
Atlanta, Georgia	John A. Dodd Co.
Baltimore, Md.	F. C. Clifford
Birmingham, Ala.	Virgil A. Smith
Boston, Mass.	C. R. Swaney Co.
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Cincinnati, Ohio	Harry A. Pillen
Cleveland, Ohio	Tomlinson Steam Specialty Co.
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El Paso, Texas	Boyd Engineering Co.
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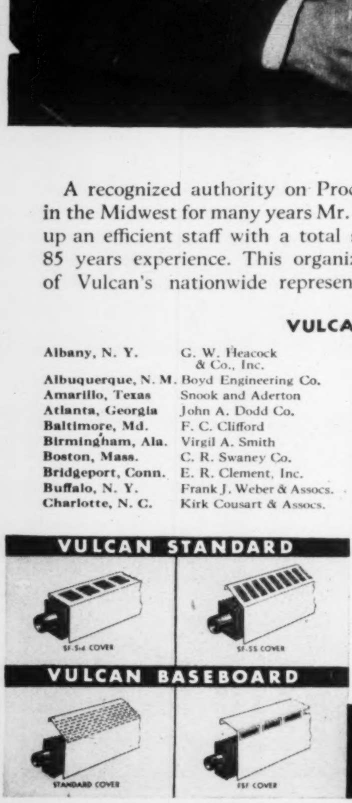

Made in Canada, under trade name of Heat Radiation, by the Vapor Car Heating Co. of Montreal.

See our Booth, 320-22, at the Show

THE VULCAN RADIATOR CO.
26 FRANCIS AVE. HARTFORD 6, CONN.

The brand most in demand...

● The tremendous popularity of U·S·S Galvanized Steel Sheets is the result of their superior workability and wearability. Made to meet the exacting requirements of sheet metal workers, these sheets are uniform in finish, in flatness, and in ductility. They shear, roll, bend, and seam exceptionally well . . . advantages that put you in better position to handle a bigger, more profitable share of business. And, because U·S·S Galvanized Steel Sheets are especially processed with a tightly adhering coating of zinc which keeps out deteriorating oxygen and water vapor, they offer high resistance to rust and corrosion . . . an advantage which gives them longer life . . . and insures better looking jobs.

How's your stock?

Do you have enough U·S·S Galvanized Steel Sheets to handle more than two or three complete jobs at a time? Don't get caught short! Remember, your customers know that the familiar U·S·S trade-mark on sheets stands for the finest quality. To say that you use U·S·S Steel Sheets may help you land additional business!

CARNEGIE-ILLINOIS STEEL CORPORATION, PITTSBURGH & CHICAGO
COLUMBIA STEEL COMPANY, SAN FRANCISCO
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST
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U·S·S STEEL SHEETS

9-1815

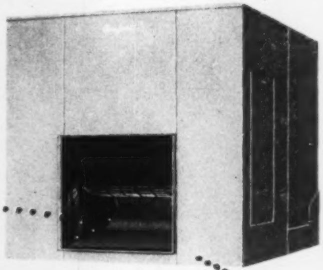
UNITED STATES STEEL

Line up with Comfort

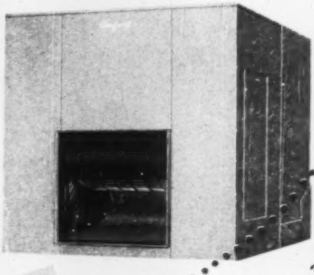
for COMFORT has a better Line Up!

offering a COMPLETE and COMPLETELY COMPETITIVE line of:

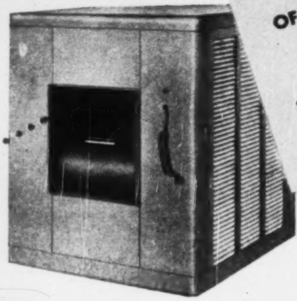
- ☆ **AIR WASHERS . . .** "King of the Coolers" in 4 sizes (from 3500 cfm to 10,000 cfm delivery)
- ☆ **Blower-Type EVAPORATIVE COOLERS** in 6 sizes (2000 to 10,000 cfm)
- ☆ **Fan-Type WINDOW COOLERS** in 3 models (1300 to 1600 cfm)

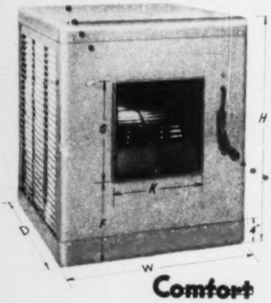

100-W

Comfort
AIR-WASHERS


35-W

See THE STARS
OF THE 1950 SHOW
at Comfort Products Corp.
Booth No. 212
S. W. Air Conditioning Exposition
DALLAS
JANUARY 23-27

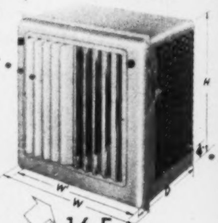

100-E



35-E

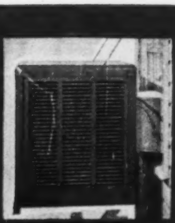
Comfort
Fan-Type
EVAPORATIVE COOLER

Comfort
Blower-Type
EVAPORATIVE
COOLERS



16-E

News for 1950!


- outside view of a conventional sash window installation

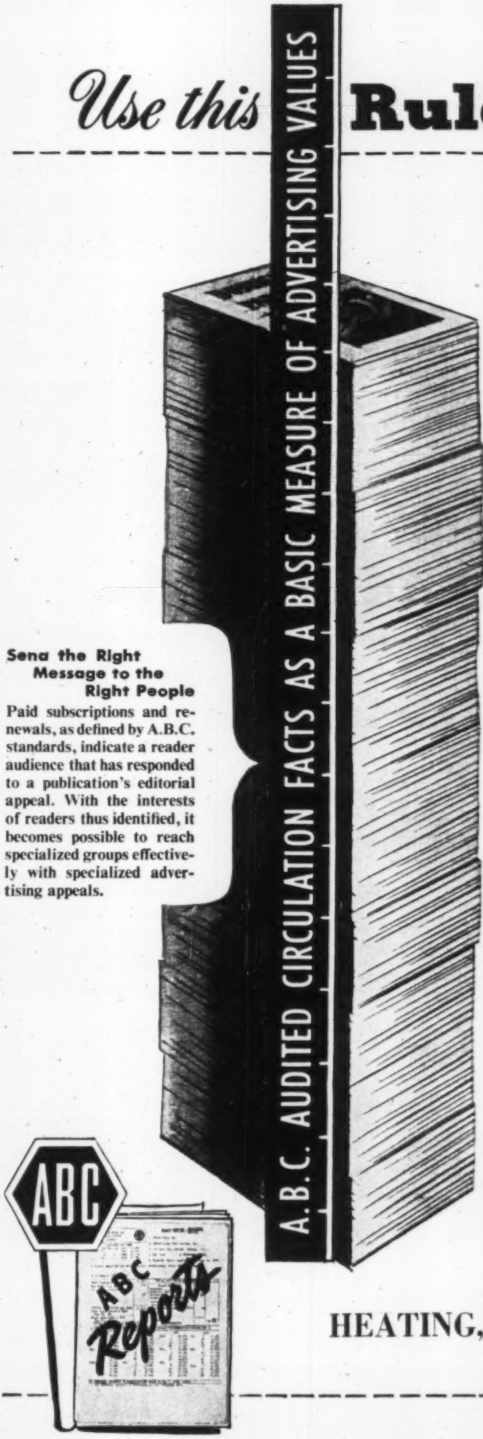
- inside view of a steel casement window installation

NEW INSTALLATION ACCESSORIES for easy installation of units 20-E to 35-E in **STEEL CASEMENT** as well as wood sash windows

for further information write to

COMFORT PRODUCTS CORP.
2220 LAMESA • DALLAS TEXAS

Use this Rule of Facts *for measuring Advertising Values*


A.B.C. AUDITED CIRCULATION FACTS AS A BASIC MEASURE OF ADVERTISING VALUES
ABC
ABC Reports

Send the Right Message to the Right People

Paid subscriptions and renewals, as defined by A.B.C. standards, indicate a reader audience that has responded to a publication's editorial appeal. With the interests of readers thus identified, it becomes possible to reach specialized groups effectively with specialized advertising appeals.

THERE is no substitute for FACTS. That goes for measuring advertising values or making laboratory tests of materials for your factory. When you buy advertising space in a publication you have a cash investment in every copy of the issue that carries your sales message. Obviously some of the people who receive the paper are better prospects for your goods and services than others. Thus the distribution of your advertising, via the publication, becomes a No. 1 factor in the success or failure of your investment. To appraise a publication's advertising value to your business therefore it is necessary to have all the facts about its circulation.

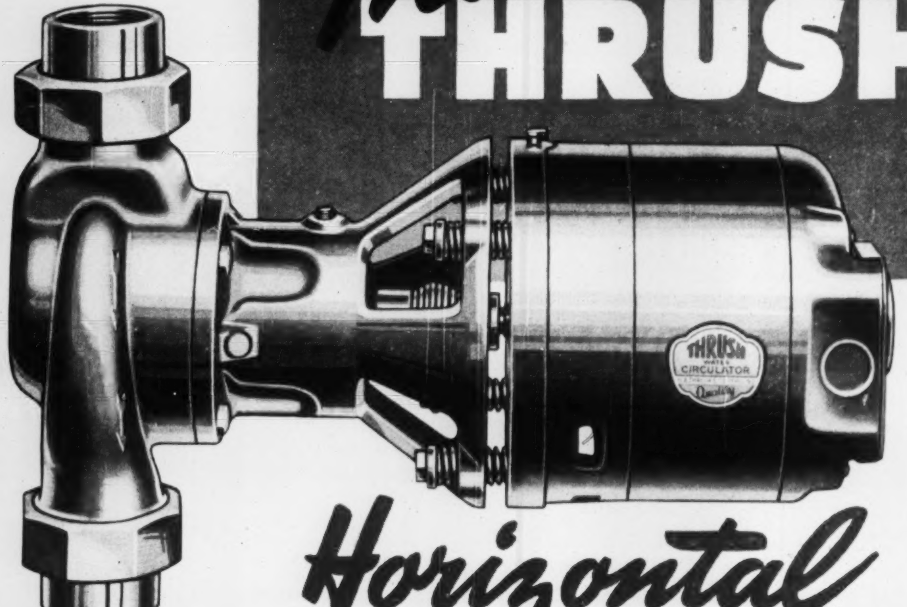
Factual information regarding the identity, quality and size of business paper audiences is available to advertisers in the reports issued by the Audit Bureau of Circulations. The Bureau, a cooperative association of 3300 advertisers, advertising agencies and publishers, has established standards for measuring circulations—maintains a staff of experienced circulation auditors to audit the circulations of publisher members—issues the information thus obtained in A.B.C. reports for space buyers to use in evaluating, comparing and selecting media.

The audited information in A.B.C. business paper reports includes the answers to these questions: **How much paid circulation? How much unpaid? What do subscribers pay? What is their occupation or kind of business? Were premiums used as circulation inducements? How many subscribers renewed? How many are in arrears? Where are the subscribers located?**

By using the audited information in A.B.C. reports in connection with market facts you can accurately judge media for its advertising value to your business. This business paper is a member of the Audit Bureau of Circulations. Ask for a copy of our A.B.C. report and then study it.

HEATING, PIPING & AIR CONDITIONING

ANNOUNCING *The New!* THRUSH



Horizontal water circulator

THRUSH Horizontal Water Circulator is new! But it's the same fine, efficient circulating pump and incorporates all the time-tested features that have made Thrush Circulators superior through the years. It has sealed-in lubrication and the patented, flexible spring coupling and motor connecting springs which assure permanent alignment between motor and impeller shaft. Has double oil and water seals. The principal difference is the motor suitable for horizontal operation. Vertical types are still available. You may have either type you prefer.

ALSO VERTICAL MODELS

★ A life-time pump . . . grooved bearing circulates oil over moving surfaces constantly.

★ Ground and polished stainless steel impeller shaft with perfectly balanced brass impeller.

★ Positive circulation with quiet, smooth operation, free from service troubles.

ASK YOUR WHOLESALER
OR WRITE DEPT. E-1 FOR MORE INFORMATION

H.A. THRUSH & COMPANY
PERU · INDIANA

FORCED CIRCULATING HOT WATER HEAT

Here's Your Quick Selection Guide for

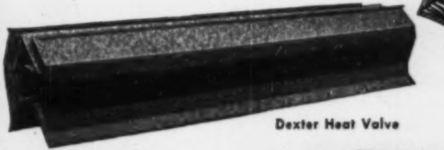
Swartwout

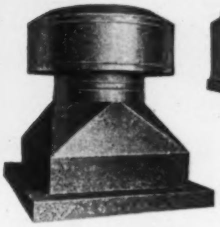
Roof Ventilators

Keep posted for present or future use. Efficient economical ventilation for any industrial building and many commercial structures. Write for these valuable Swartwout Bulletins—No. 335 and No. 333A.

Swartwout
ATORS
How to Install
Swartwout
Roof Ventilators

Gravity Ventilators


Dexter Heat Valve


VALVENT

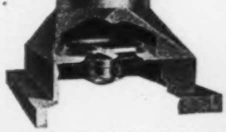
AIRMOVER

Rotary

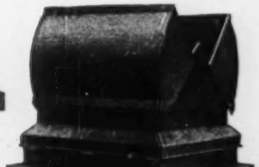
AIRVALVE

Powered Ventilators

Airjector


Powered VALVENT

Also Industrial Intake Louvers


Ject-O-Valve

Swartwout

Industrial Ventilating Specialists

THE SWARTWOUT COMPANY • 18511 Euclid Ave., Cleveland 12, Ohio

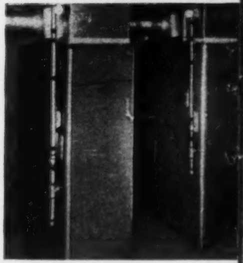
odern *Personalized* heating for modern apartments

IN AKRON

PARKVIEW APARTMENTS, South Hawkins Ave.

The Hendrich Hall Harter Company, Builders and Operators

Photograph shows part of Parkview Manor consisting of 17 buildings housing 98 suites. Last word in modern conveniences, individual Gas-Fired Janitrol Winter Air Conditioners provide personalized heating for each family unit.



Basement installations of Janitrol units are extremely compact, clean and easily accessible. Same type units are often installed in closets or hallways immediately adjacent to individual apartments.

IN BUFFALO

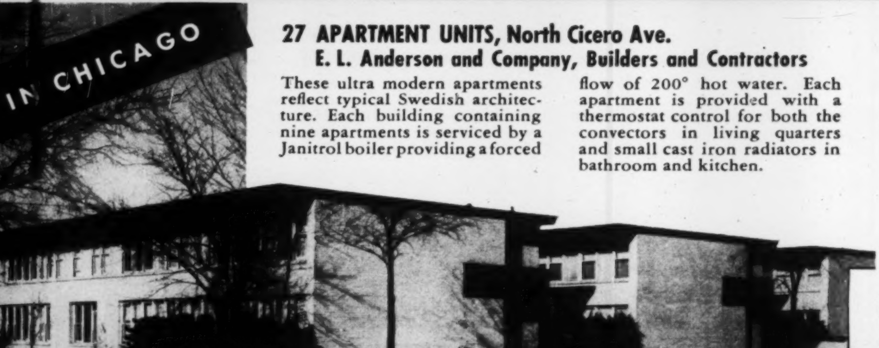
HIGHLAND COURT APARTMENTS,

Typical of Several Multiple Units built by R. C. Dewey, Inc.

Janitrol Triple Service Systems are exclusive equipment with this builder. Efficient operation and low maintenance costs influenced Mr. R. C. Dewey's choice of Janitrol for servicing 200 family units. Providing convector radiation with forced hot water circulation, the Janitrol units also supply hot water for all domestic uses.

One compact Janitrol Unit supplies hot water for heating as well as for daily household hot water needs. Units are also widely used for radiant panel heating systems, either gas or oil fired.

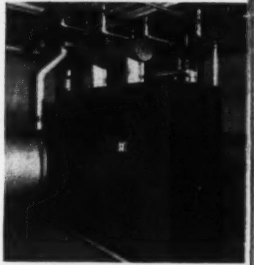
IN CHICAGO



27 APARTMENT UNITS, North Cicero Ave.

E. L. Anderson and Company, Builders and Contractors

These ultra modern apartments reflect typical Swedish architecture. Each building containing nine apartments is serviced by a Janitrol boiler providing a forced flow of 200° hot water. Each apartment is provided with a thermostat control for both the convectors in living quarters and small cast iron radiators in bathroom and kitchen.



Janitrol Cast Iron Boiler with gross output of 486,000 b.t.u./hr. Forced hot water system is maintained by continuous pump operation.

IME-TESTED TIME-PROVEN

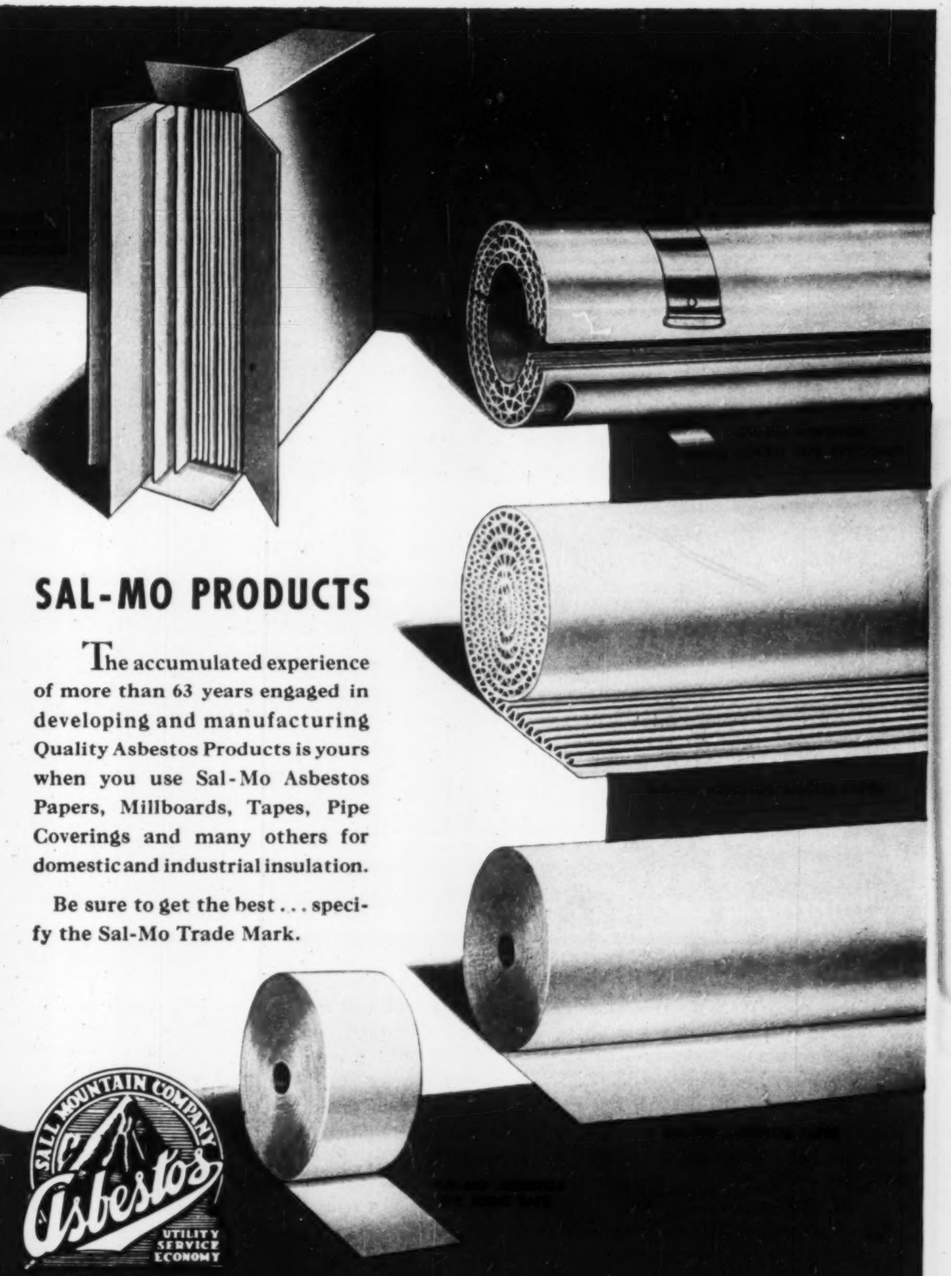
Janitrol

GAS FIRED WINTER AIR CONDITIONERS • UNIT HEATERS
GRAVITY FURNACES • BOILERS • GAS AND OIL FIRED
TRIPLE SERVICE HOT WATER SYSTEMS

★ *Write today!*

With the complete Janitrol line you are better equipped to get a bigger share of multiple housing and commercial heating business. Your letter will bring quick response about Janitrol's Profit Plans for 1950. Address—

SURFACE COMBUSTION CORPORATION.
TOLEDO, OHIO.



SAL-MO PRODUCTS

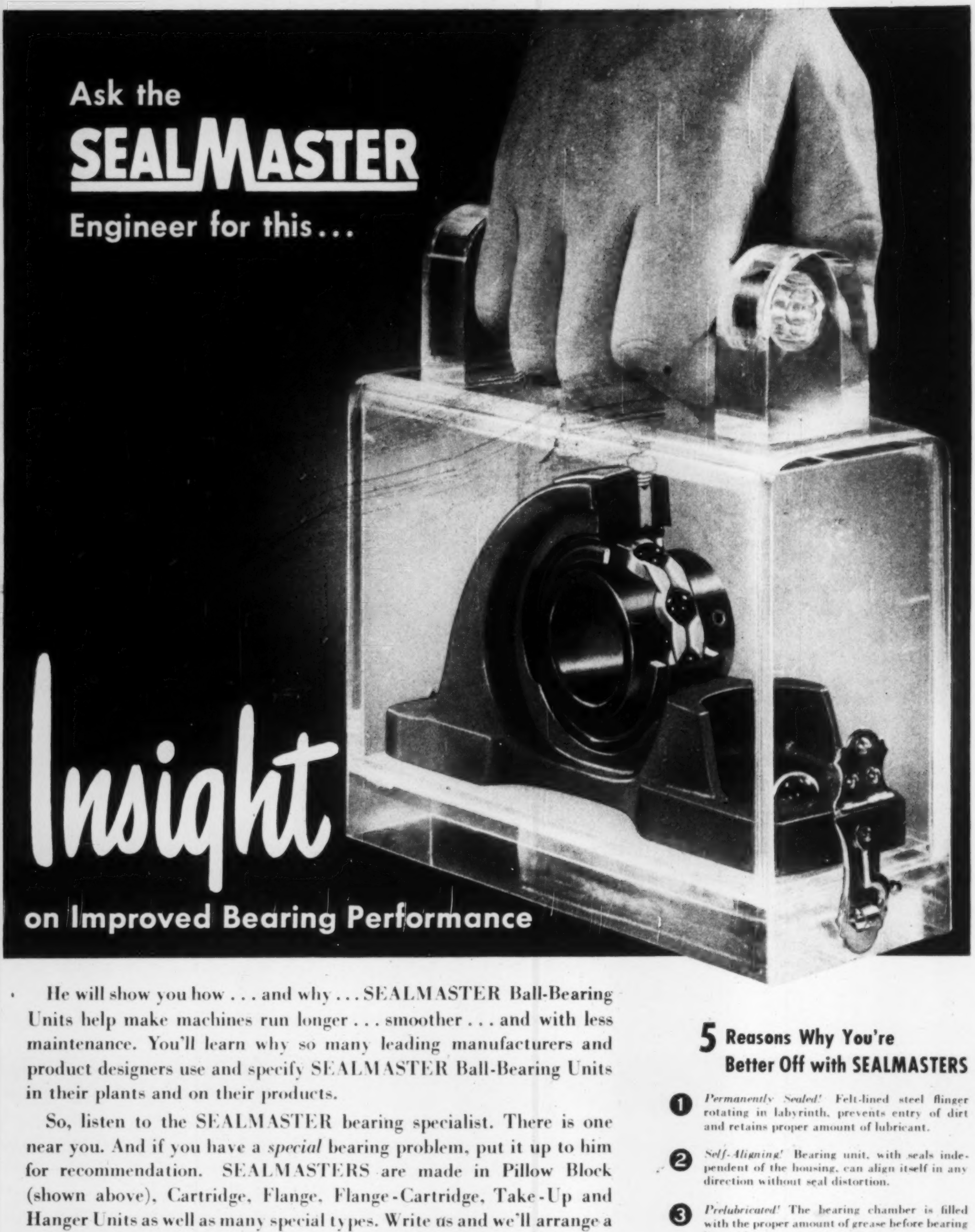
The accumulated experience of more than 63 years engaged in developing and manufacturing Quality Asbestos Products is yours when you use Sal-Mo Asbestos Papers, Millboards, Tapes, Pipe Coverings and many others for domestic and industrial insulation.

Be sure to get the best . . . specify the Sal-Mo Trade Mark.

SALL MOUNTAIN COMPANY
Asbestos
UTILITY
SERVICE
ECONOMY

SALL MOUNTAIN COMPANY

ANdover 3-2414 • 176 WEST ADAMS STREET • CHICAGO 3, ILLINOIS



He will show you how . . . and why . . . SEALMASTER Ball-Bearing Units help make machines run longer . . . smoother . . . and with less maintenance. You'll learn why so many leading manufacturers and product designers use and specify SEALMASTER Ball-Bearing Units in their plants and on their products.

So, listen to the SEALMASTER bearing specialist. There is one near you. And if you have a *special* bearing problem, put it up to him for recommendation. SEALMASTERS are made in Pillow Block (shown above), Cartridge, Flange, Flange-Cartridge, Take-Up and Hanger Units as well as many special types. Write us and we'll arrange a quick appointment. Also, there's a catalog available. Write for it today.

Bearing Division
STEPHENS-ADAMSON
47 Ridgeway Avenue, Aurora, Illinois MFG. CO. Los Angeles, Calif. • Belleville, Ontario

5 Reasons Why You're Better Off with SEALMASTERS

❶ *Permanently Sealed!* Felt-lined steel flinger rotating in labyrinth, prevents entry of dirt and retains proper amount of lubricant.

❷ *Self-Aligning!* Bearing unit, with seals independent of the housing, can align itself in any direction without seal distortion.

❸ *Prelubricated!* The bearing chamber is filled with the proper amount of grease before bearing leaves factory.

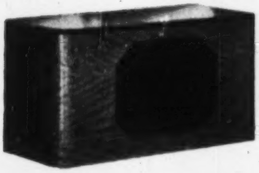
❹ *No Housing Wear!* Patented locking pin and dimple prevent rotation of outer race in housing, thus eliminating housing wear . . . permit shaft alignment and position unit for relubrication.

❺ *Floating Retainer!* Ball retainer is designed to float on ground inner surface of outer race . . . traps lubricant and prevents churning.

FACTORY REPRESENTATIVES AND DEALERS IN ALL PRINCIPAL CITIES

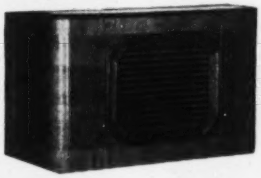
SEE THE MOST COMPLETE LINE OF ROOM AIR CONDITIONERS

by Remington



The BEDFELLOW
(Model 6)

A ½ hp window unit with maximum cooling power of any ½ hp model. New hermetic compressor with 5-year warranty. Featured for bedroom cooling, for which it is ideal. Up to 6000 btu/hr. 115-60-1.



The PROFESSIONAL
(Model 8)

¾ hp window unit with maximum cooling power of any ¾ hp model. New hermetic compressor with 5-year warranty. Featured for use in business and professional offices, as well as homes. Up to 8800 btu/hr. 115/230 volts; 50/60 cycles.

The DIRECTOR
(Model 10)

1¼ hp console unit, hermetic, air cooled, exceptional cooling power, hand rubbed wood cabinet. Featured for living rooms, substantial offices, and directors' rooms. Offered with heating and cooling. Up to 11,000 btu/hr. cooling. For AC or DC. (Also in water-cooled, model 10W.)

The OVERTON
(Model 12)

1¾ hp console unit, air cooled, choice of genuine mahogany or blond avodiré wood cabinets. For large offices and living rooms, or especially severe conditions. Offered with heating and cooling. Up to 13,500 btu/hr. cooling. AC or DC. (Also in water-cooled, model 12W.)

in Booth No. 265
at the A. S. H. & V. E. show
in Dallas, January 23-27

CONSOLES • WINDOW UNITS
AIR COOLED • WATER COOLED
REMOTE INSTALLATION UNITS
MODELS FOR AC OR DC

New **MODELS THAT HEAT AS WELL AS COOL**

New **ROOM VENTILATORS**

More than ever, REMINGTON this year has *the most complete line!* Remington dealers won't miss a single sale for lack of the right unit for every job.

They'll make more sales *the year around* with *new* Remington units that heat as well as cool, and the *new* Remington room ventilator.

Distributors! Remington has several highly desirable areas open for aggressive distributors. See us in Dallas during the Show or write today for details.

New ROOM VENTILATOR
Instantly adjustable to bring in filtered, outside air; to exhaust stale or smoky air from the room; or to filter and recirculate room air. Quiet, efficient, economical in first cost and operation. Adjustable air volume; weatherproof.

REMINGTON AIR CONDITIONING

DIVISION OF REMINGTON CORPORATION
CORTLAND, N. Y.   CABLES — REMINGAIR

FOR GOOD SERVICE IN GOOD CONNECTIONS

Get acquainted with the well-stocked Tube-Turn distributor in your locality

TUBE-TURN
TRADE MARK
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WELDING FITTINGS AND FLANGES

He handles the firmly established, quality brand of welding fittings and flanges. He handles a wide range of types and sizes. He carries a big stock. He knows piping. He is close at hand. For his address, write, wire, or phone your nearest Tube Turns' district office.

TUBE TURNS, INC.
GENERAL OFFICES & FACTORY: LOUISVILLE 1, KENTUCKY

Chicago: 600 South Michigan Avenue, Harrison 7-8527
Houston: 1704 Commerce Building, Charter 1668
Los Angeles: 447 General Petroleum Building, Madison 6-3219
New York: 150 Broadway, Rector 2-7844
Philadelphia: Broad Street Station Building, Rittenhouse 6-0722
Pittsburgh: 3001 Grant Building, Atlantic 1-8848
San Francisco: 2611 Russ Building, Garfield 1-2594
Tulsa: 317 South Detroit Avenue, Telephone 2-9193

TUBE-TURN SEAMLESS WELDING FITTINGS—RANGE OF SIZES

DESCRIPTION	STANDARD WEIGHT	EXTRA STRONG	SCHEDULE 160	DOUBLE EXTRA STRONG	LIGHT GAUGE	
					NOMINAL PIPE SIZE	IRON PIPE SIZE
ELBOWS—90° Long Radius	½"-24"	½"-24"	1"-12"	¾"-8"	4"-24"	¾"-12"
ELBOWS—90° Short Radius	1"-30"	1½"-30"				
ELBOWS—45° Long Radius	½"-30"	¾"-30"	1"-12"	¾"-8"	4"-24"	¾"-12"
RETURNS—180° Long Radius	½"-24"	½"-24"	1"-12"	2"-8"	4"-24"	¾"-12"
RETURNS—180° Short Radius	1"-30"	1½"-30"				
RETURNS—180° Extra Long Radius	1"-2½"	1"-2½"				
TEES—Straight	½"-24"	½"-24"	½"-12"	½"-8"		
TEES—Reducing Outlet	½"-24"	½"-24"	¾"-12"	¾"-8"		
REDUCERS—Concentric and Eccentric	¾"x⅜"-24"x 20"	¾"x⅜"-24"x 20"	¾"x⅜"-12"x 10"	¾"x½" 8"x 6"		
CAPS	¾"-24"	¾"-24"	1"-12"	1"-8"		
STUB ENDS—Lap Joint	½"-24"	½"-24"				
SADDLES	2"-24"**					
LATERALS—Straight	1"-24"	1"-24"				
LATERALS—Reducing-on-run	1"-24"	1"-24"				
CROSSES—Straight and Reducing	¾"-24"	¾"-24"				
RINGS—Welding, Grove Type	¾"-24"	1"-24"		1¼"-8"		
RINGS—Welding, Ridge Type	¾"-12"	¾"-12"				
SLEEVES—Welding	2"-24"**					

** Since saddles and sleeves are for external reinforcement only, they do not conform to iron pipe size thicknesses.

TUBE-TURN FORGED STEEL FLANGES—RANGE OF SIZES

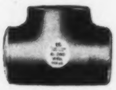
DESCRIPTION	150 LB.	300 LB.	400 LB.	600 LB.	900 LB.	1500 LB.	2500 LB.
WELDING NECK	½"-24"	½"-24"	½"-24"†	½"-24"	½"-24"	½"-24"	½"-12"
SLIP-ON	½"-24"	½"-24"	½"-24"†	½"-24"	½"-24"*	½"-24"	½"-12"
LAP JOINT	½"-24"	½"-24"	½"-24"†	½"-24"	½"-24 *	½"-24"	½"-12"
THREADED	½"-24"	½"-24"	½"-24"†	½"-24"	½"-24"*	½"-12"	½"-12"
BLIND	½"-24"	½"-24"	½"-24"†	½"-24"	½"-24"*	½"-24"	½"-12"
SOCKET TYPE	¾"-24"	¾"-4"	¾"-3½"†	¾"-3½"			
REDUCING—Threaded or Slip-On	¾"-24"	¾"-24"	¾"-24"†	¾"-24"	¾"-24"*	¾"-12"	¾"-12"
ORIFICE—Threaded		1"-24"	4"-12"	4"-12"	3"-12"	1"-12"	
ORIFICE—Slip-On		1"-24"					
ORIFICE—Welding Neck		1"-24"	4"-12"	1"-12"	3"-12"	1"-12"	

† Dimensions on sizes thru 3½" same as for 600 lb. flanges.
* Dimensions on sizes thru 2½" same as for 1500 lb. flanges.

90° Short Radius Elbow

90° Long Radius Elbow

45° Long Radius Elbow


Straight Tee

Reducing Outlet Tee

Concentric Reducer

Eccentric Reducer

Lap Joint Stub End

180° Long Radius Return

Cap

Straight Lateral

Saddle

Straight Cross

Welding Neck Flange

Blind Flange

Welding Ring

Socket Flange

Lapped Flange

Threaded Flange

In addition to carbon steel welding fittings and flanges listed here, the complete Tube-Turn line embraces many other metals and alloys—types 304, 347, and 316 stainless steel, carbon moly and chrome moly steels, copper, aluminum, brass, Monel Metal, Inconel, nickel, wrought iron. Ask your Tube-Turn distributor for catalogs and other reference material.

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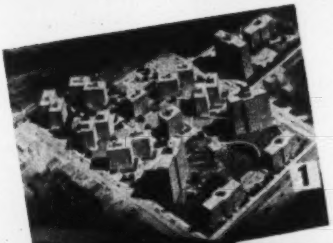
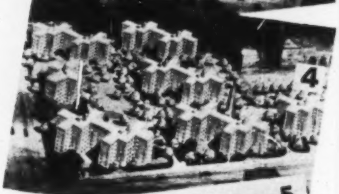
THERM-O-TILE

REG. U. S. PAT. OFF.

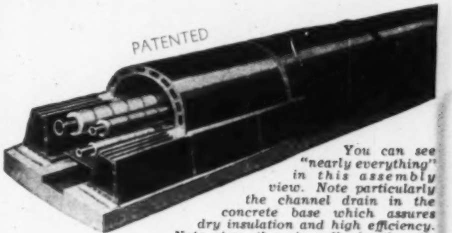




UNDERGROUND STEAM CONDUIT in NEW YORK CITY during 1949

These pictures show where 6 of the many Therm-O-Tile installations were made during 1949 — all of them in New York City Housing Projects.

1. The photo marked "1" shows the Parkside Houses;
2. Todt Hill Houses;
3. Albany Houses;
4. Pelham Parkway Houses;
5. Elliott Houses;
6. Lillian Wald Houses.

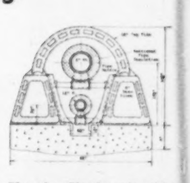


You can see "nearly everything" in this assembly view. Note particularly the channel drain in the concrete base which assures dry insulation and high efficiency. Note, too, the air cells in the tile envelope.

Sold and Installed by Johns-Manville Construction Units in All Principal Cities.

OTHER LARGE NEW YORK PROJECTS

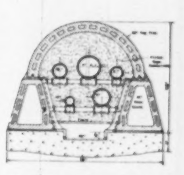
Most of the installations shown here were mentioned in this magazine during 1949. In addition there were the Lester W. Patterson houses; General C. W. Berry Houses; Brownsville Houses; Abraham Lincoln Houses; Marcy Houses; James Weldon Johnson Houses; and Amsterdam Houses. In the January 1949 issue of this journal we told about the largest of its kind in our nation—a $30,000,000 project — Glen Oaks Village — which was awarded first prize and in which THERM-O-TILE is employed throughout.



Showing Single or Double Pipe Lines Using Sectional Pipe Insulation as, for example, in the Huge Glen Oaks Village Project.

WHAT IS THE REASON? WHY THERM-O-TILE?

There are several reasons why Therm-O-Tile is so consistently specified in huge projects such as these. Therm-O-Tile is the simplest, strongest, most efficient, and most economical underground pipe conduit obtainable for *permanently* protecting and insulating heating mains. It is ideal for central heating plants, airports, factories, colleges, gas plants, greenhouses, hospitals, power stations, textile mills, rubber factories, steel plants, etc.

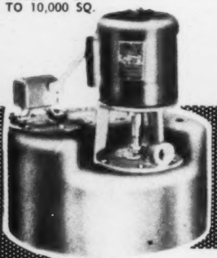


Showing Multiple Pipe Lines Using Filler Type Insulation.

Bulletin 381 gives complete information. Ask for a copy.

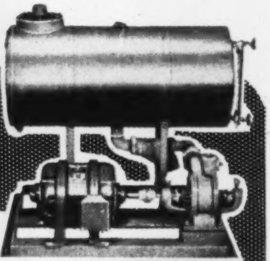
H. W. PORTER & CO., INC.
822-H Frelinghuysen Ave., Newark 5, N. J.
BALTIMORE, MD. — CHARLOTTE, N. C. — RICHMOND, VA.

★ TYPE "CV" VERTICAL PUMP FOR LIMITED SPACE — CAPACITIES 500 TO 10,000 SQ. FT. E.D.R.



It's the Talk of the SHOW!

★ TYPE "TM" HIGH PRESSURE TURBINE PUMP—PRESSURES TO 150 LBS. BOILERS 250 H.P.



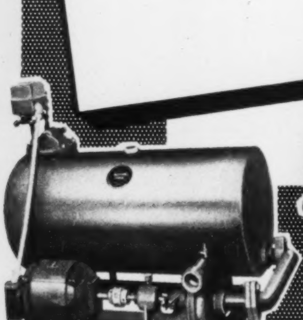
SKIDMORE

☆ Out in Front Again!

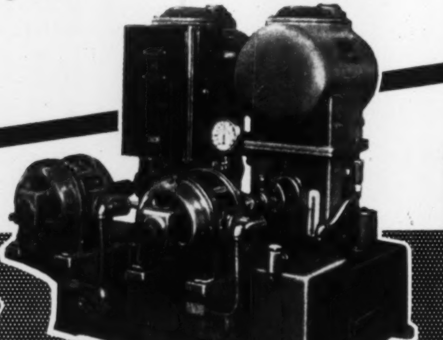
Skidmore Pumps the time tested favorite . . . yes, wherever pump performance is foremost . . . wherever proper selection and installation is all important, there's a Skidmore Pump to do the job efficiently. Day in and day out dependability, year in and year out service, that's what you get from Skidmore Pumps. Sure of their skill and backed by sound construction, Skidmore Pumps have been a favorite for over a quarter of a century.

★ See the Skidmore Show, Booth 351 (The Right Pump for Every Purpose) at the Heating and Ventilating Exhibition Jan. 23-27, Dallas, Texas. Write for Bulletins and Engineering data on the Skidmore Pumps.

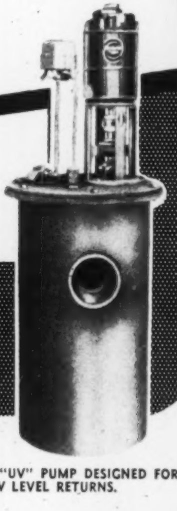
SKIDMORE CORPORATION ST. JOSEPH, MICHIGAN



★ TYPE "HS" CONDENSATE PUMP AND RECEIVER EFFICIENT, ECONOMICAL



★ VACUUM PUMP SINGLE AND DUPLEX, RANGE FROM 5,000 TO 100,000 SQ. FT. E.D.R.



★ TYPE "UV" PUMP DESIGNED FOR BELOW LEVEL RETURNS.

IT TOOK 20 YEARS TO BUILD ITS

reputation

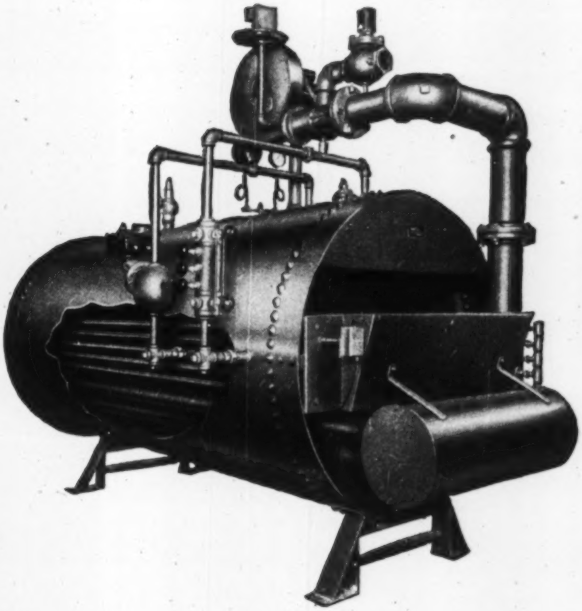
Folks may have been a bit skeptical about a Sellers Immersion Steam Boiler twenty years ago. But it's a different story today. The Sellers system of Immersion Firing has proved itself in hundreds of installations. With nation-wide acceptance and enthusiastic endorsement in industries of all types, it has a reputation that's hard to equal.

FOR EFFICIENCY There's no heat loss in a Sellers Immersion Steam Boiler. The gas-fired tubes are completely submerged. Heat has only one place to go . . . into the water. Furthermore, scale can't built up. It's continually cracked off as tubes expand and contract. There's nothing to interfere with continued high efficiency.

FOR SAFETY The well known hazards of a closed combustion chamber are eliminated in this unit. The Sellers system of Immersion Firing makes complete enclosure of burners unnecessary.

FOR ECONOMY There's no water line corrosion . . . you get fast steaming and dry steam . . . and the low water line simplifies direct return of condensate without traps or pumps. Everything about a Sellers adds up to maximum economy.

Our Bulletin No. 1206-C contains full details about the 12 sizes available for prompt delivery. Write for your free copy today.



Sellers

IMMERSION
STEAM BOILER

Sellers Engineering Company
4876 N. Clark St. Chicago 40, Illinois

Blast Heaters — Immersion Automatic Water Heaters — Air Heaters — Combustion Units — Industrial Gas Burners — Immersion Tank Heaters — Vertical Steam Boilers — Gas Combustion Equipment.

AN INVITATION
TO ATTEND OUR
Premier Showing
AT THE
SOUTHWEST
AIR CONDITIONING EXPOSITION
Dallas—January 23 to 27, 1950

BOOTH 438

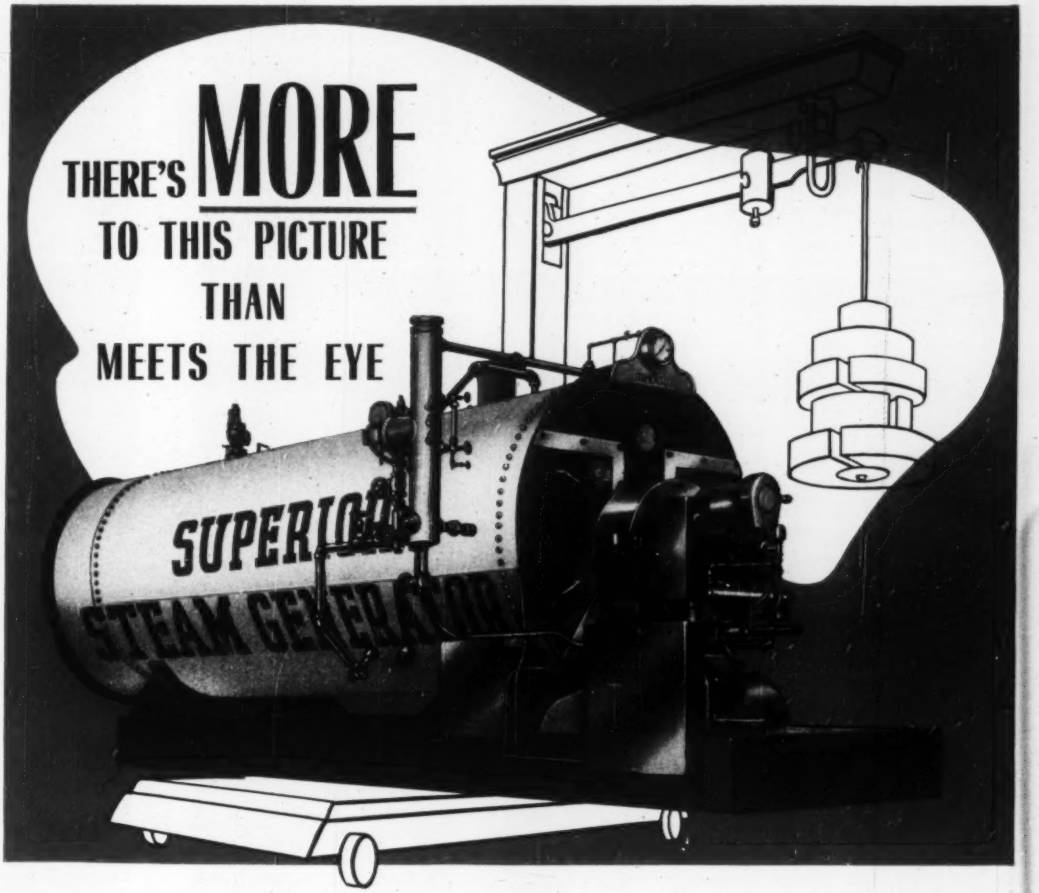
A MULTI-VELOCITY AIR-FILTER *by* RP

THE years of continuing research and development that have gone into the building of all previous R-P Air Filters is background for the surprising performance of the new filter to be announced at the Dallas Show. We assure you that a visit to our booth will prove interesting and valuable to you. If you are not in Dallas, a post card will bring the story direct to your office.

Write Research Products Corp., Department H, Madison 10, Wis. Canadian Representative — Delhi Industries, Delhi, Ontario.

RP . . . PRODUCTS OF RESEARCH

WASHABLE AND REPLACEMENT AIR FILTERS • GREASE FILTERS • EVAPORATIVE COOLER MATERIALS



What's this . . . steam generators by the pound?

But doesn't it make sense that greater heating surface and larger steaming areas go hand-in-hand with increased weight? And doesn't sturdy, rugged, built-for-life construction add even more weight?

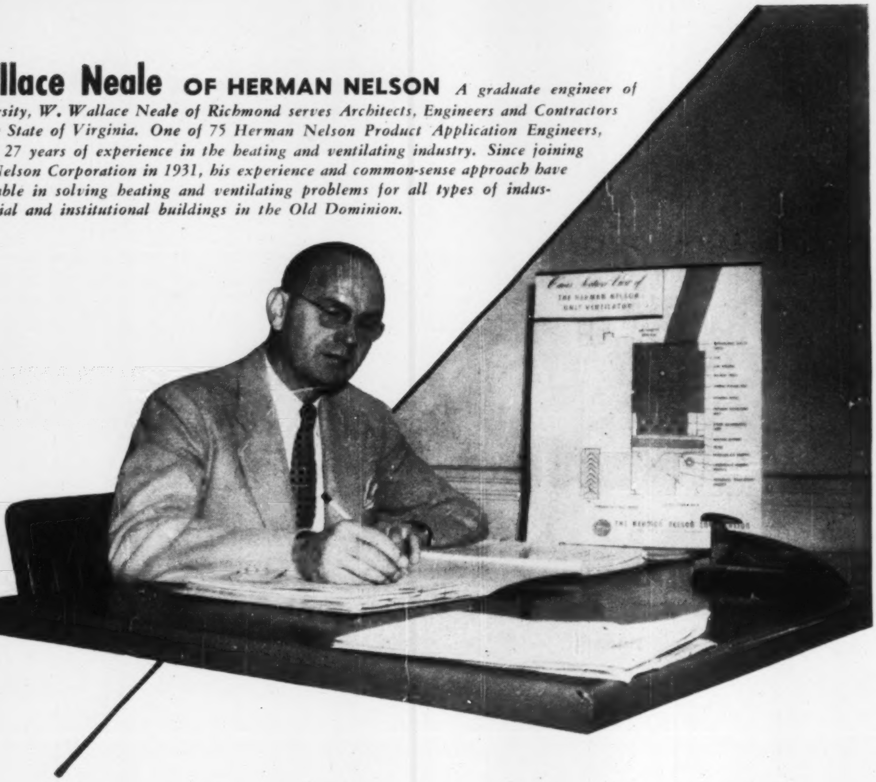
Of course it does . . . and that's a thought which tips the balance with consulting engineers who specify *Superior* Steam Generators. For after weighing all the factors of unit purchase with undivided responsibility, completely automatic operation with any kind of oil or gas, induced draft which eliminates the need of a chimney, simple installation, and guaranteed thermal efficiency in excess of 80% . . . after all this, specifying engineers look for long-lived dependability . . . and find it in Superior's rugged construction, ample steam space and larger heating surfaces . . . the features which make Superior Steam Generators weigh more.

Superior Steam Generators are available in capacities from 20 to 500 b. h. p. for pressures up to 250 p. s. i. For complete details write for catalog 204.

Superior Combustion Industries, inc.

Factory Emmaus Pa
Executive Offices Times Building Times Square New York 18 N Y

W. Wallace Neale **OF HERMAN NELSON** *A graduate engineer of Cornell University, W. Wallace Neale of Richmond serves Architects, Engineers and Contractors throughout the State of Virginia. One of 75 Herman Nelson Product Application Engineers, Mr. Neale has 27 years of experience in the heating and ventilating industry. Since joining The Herman Nelson Corporation in 1931, his experience and common-sense approach have proved invaluable in solving heating and ventilating problems for all types of industrial, commercial and institutional buildings in the Old Dominion.*



Richmond, Rochester, Racine, Reno—from coast to coast—Herman Nelson Product Application Engineers like W. Wallace Neale stand ready to assist you and your clients. These men are thoroughly familiar with all types of heating and ventilating problems. From their experience and ability have come the *right* answers to thousands of heating and ventilating problems involving industrial, commercial and institutional buildings of all types.

Each Product Application Engineer combines a keen sense of practicability with technical knowledge in the correct application and installation of Herman Nelson Products. All of them operate on the policy that your customers must receive the maximum efficiency and economy they have a right to expect from Herman Nelson Unit Ventilators, Unit Heaters, Unit Blowers, Propeller Fans and Centrifugal Fans.

More than 250 Distributors and Stocking Jobbers, with personnel trained in the application and installation of Herman Nelson Products, work closely with Herman Nelson Branch Offices and Product Application Engineers. Together, they make up an organization upon which you can depend for sound advice as well as detailed product information and accurate engineering data.

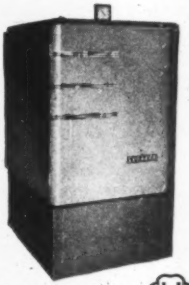
herman nelson

THE HERMAN NELSON CORPORATION
Since 1906 Manufacturers of Quality Heating and Ventilating Products
MOLINE, ILLINOIS

When your plans say "Heating"...

This lovely residence, the home of Mr. and Mrs. Forrest Beyer at Red Hill, Pennsylvania, is equipped with a dependable Spencer Boiler. *Architect:* Charles M. Talley, Telford, Pennsylvania. *Heating Contractor:* Paul Schlicher, East Greenville, Pennsylvania.

EXPERIENCE SAYS . . . "SPENCER"!



Constructed in accordance with ASME requirements. Fully approved by the Steel Boiler Institute.

- Whatever your heating needs—residential or commercial—there's a dependable Spencer of the right type and capacity to meet your most exacting specifications, to solve your most difficult problem.

The Spencer Boiler pictured here is typical of the wide range of models. Its many fine features make it especially adaptable for many uses.

THERE IS A SPENCER FOR *EVERY* TYPE OF BUILDING, FOR *EVERY* FUEL

● For light commercial uses	13 models
● For heavy commercial uses	34 models
● For homes, small buildings	29 models

76 MODELS

—ranging in capacities from 290 to 42,500 net load, steam—

- **Take any type of customary fuel**—oil, gas, coke, and anthracite or bituminous coal
- **Fit various methods of firing**—oil burner, automatic stoker, or hand firing
- **Adaptable to difficult locations**—permitting either front, rear, or side installation of oil burner or stoker unit
- **Quick-heating**—staggered, divided tubes speed water circulation, provide fast steaming
- **Economical**—exclusive peaked firebox aids in complete combustion, conserves fuel
- **Cut installation costs**—all Spencer Boilers are designed for quick, easy installation, thus effecting substantial saving in material and labor right at the very start

WRITE FOR COMPLETE CATALOG

SPENCER
HEATER
LYCOMING-SPENCER DIVISION
WILLIAMSPORT AVCO PENNSYLVANIA

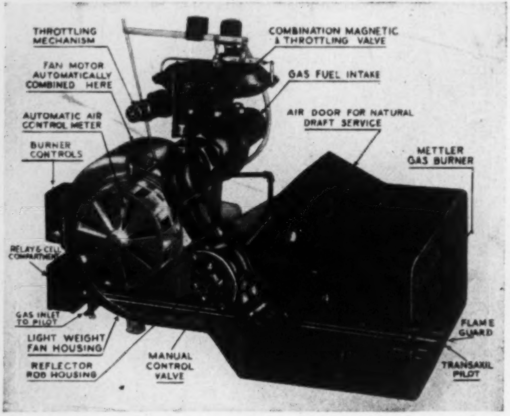
The Mettler ENTRAINED COMBUSTION Gas Burners

REG. U.S. PAT. OFF. EXPERTO CREDE

Preferred Because They Are the Best

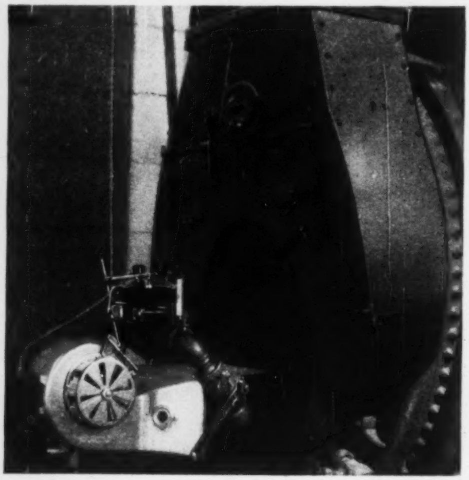
The Mettler "FAN-AIR" Gas Burner

LATEST MODEL FEATURES NEW AUTOMATIC SAFETY PILOT and TRIPLE CONTROLS


THROTTLING MECHANISM
FAN MOTOR AUTOMATICALLY COMBINED HERE
AUTOMATIC AIR CONTROL METER
BURNER CONTROLS
RELAY & CELL COMPARTMENT
GAS INLET TO PILOT
LIGHT WEIGHT FAN HOUSING
REFLECTOR ROD HOUSING
MANUAL CONTROL VALVE
COMBINATION MAGNETIC & THROTTLING VALVE
GAS FUEL INTAKE
AIR DOOR FOR NATURAL DRAFT SERVICE
METTLER GAS BURNER
FLAME GUARD
TRANSAXIL PILOT

FOR YOUR PROTECTION AND SAFETY

Picture reveals some of the essential and desirable POINTS of FAN-AIR MECHANICAL DRAFT GAS BURNERS. Not just a burner but a COMPLETE and FULLY AUTOMATIC GAS BURNER SYSTEM, factory tested and ready for application when received. Furnished complete as pictured with simple, dependable automatic "On and Off" or modulating controls. Burner and Controls WITH SPARK IGNITION and FLAME SAFEGUAKDS are scientifically coordinated to provide INSTANT FUEL SHUT-OFF on FLAME FAILURE MEETING APPROVAL REQUIREMENTS. Why be satisfied with less—when all these tangible advantages are so readily available. Sizes 5 to 500 H.P.

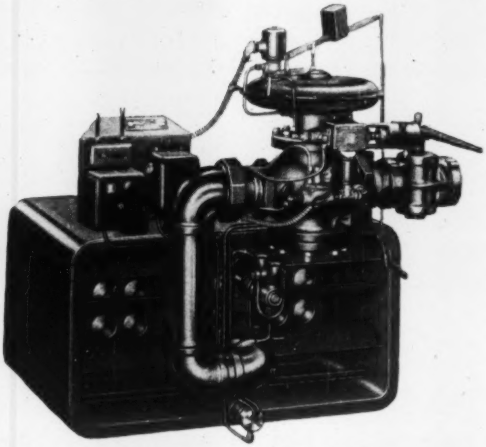


A typical Scotch Marine "FAN-AIR" application is pictured above, representing the modern way to fire gas fuel in boilers having all black surface. Note the simplicity and flexibility. PROMPT SHIPMENTS.

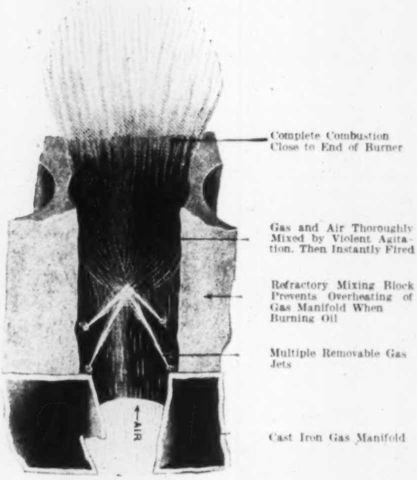
THE SERIES "C"

FOR NATURAL DRAFT OPERATION ONLY

Picturing latest model series (C-9) Combination Gas & Steam Atomizing Oil Burner "Packaged" fully automatic "On & Off" and throttling fuel control with spark ignited rectifier pilot & electronic flame guard equipment. Sizes from 10 to 250 H.P.



Oil Feature Not Available on Small Sizes


Complete Combustion Close to End of Burner
Gas and Air Thoroughly Mixed by Violent Agitation. Then Instantly Fired
Refractory Mixing Block Prevents Overheating of Gas Manifold When Burning Oil
Multiple Removable Gas Jets
Cast Iron Gas Manifold
←AIR

Here's Why

THERE'S A DIFFERENCE IN GAS BURNERS

Above sectional view graphically depicts the EXCLUSIVE and unique design of a METTLER BURNER CASTING. Note how it "Mixes" gas and air.

Our New Larger Plant Facilities Enables Us to Serve You Better in 1950

Some Territory Open for Qualified Agents

LEE B. METTLER CO.

LOS ANGELES 13 **406 South Main Street** **CALIFORNIA**

MORE HEAT wherever you need it at LESS COST whenever you use it

KRITZER RADIANT COILS, INC.

KRITZER CONCEALED "FIN-TUBE" RADIANT COILS
KRITZER "DELUXE" RADIANT BASEBOARD COILS
KRITZER "STANDARD" RADIANT BASEBOARD COILS
KRITZER COMMERCIAL "FIN-PIPE" COILS

WHAT'S YOUR HEATING PROBLEM?

Whatever it is we can solve it completely and economically with the sensational, high quality Kritzer Heating Coils. Installed by the foot instead of the fitting . . . for ceilings, walls, baseboards, or floors.

- *The economical way.*
- *The efficient way.*
- *The Kritzer Way.*

KRITZER
KRITZER

Write for these booklets now and get INFORMATION and ENGINEERING Data on this complete line of top quality Kritzer Heating Coils for your next installation whether it is Residential, Commercial, or Industrial. No obligation.

Kritzer Radiant Coils, Inc., 2905 W. Lawrence Ave., Chicago 25, Illinois

When visiting at the Southwest Air
Conditioning Exposition in Dallas,
stop at our booths
in the Hall of Agriculture,
State Fair Grounds, January 23-27.

☐ Kritzer "Fin-Tube" Radiant Coils
☐ Kritzer Radiant Baseboard Heating
☐ Kritzer Commercial "Fin-Pipe" Coils

Marsh valves and traps throughout . . . IN CHICAGO'S

MODERN FLORSHEIM PLANT

HEDRICH-BLESSING STUDIO

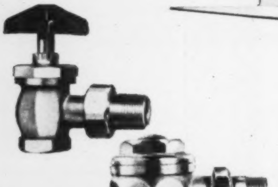
This new plant of the Florsheim Shoe Co. has been described as Chicago's 1949 architectural masterpiece. Only the best was good enough for this model establishment . . . and that is why Marsh Traps and Valves were used throughout.

The heating system contains a large number of Marsh Float and Thermostatic Traps of indicated types, and radiation is equipped with hundreds of Marsh Packless Radiator Valves and Radiator Traps.

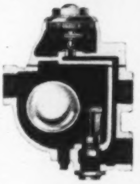
Ask for facts about Marsh valves, traps and venting devices —time tested equipment, preferred by the most discriminative heating men.

ARCHITECT & ENGINEER
Shaw, Metz & Dolio, Chicago

PLUMBING & HEATING
M. J. Corboy Co., Chicago



Marsh Packless Valves and Radiator Traps are used throughout in the Florsheim plant.

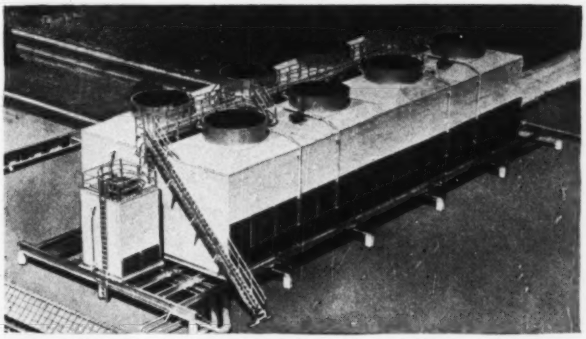


Marsh No. 12 Float and Thermostatic Trap—typical of many float and thermostatic traps, which include Marsh No. 8 and No. 14 Traps.

Marsh Heating Equipment Co., *Sales Affiliate of Jas. P. Marsh Corporation,* **Dept. T, Skokie, Ill.**

MARSH *Heating Specialties*

SINCE 1865



Double Cased, All Redwood, Serving Air Conditioning Unit at Shamrock Hotel, Houston, Texas

Lilie-Hoffmann

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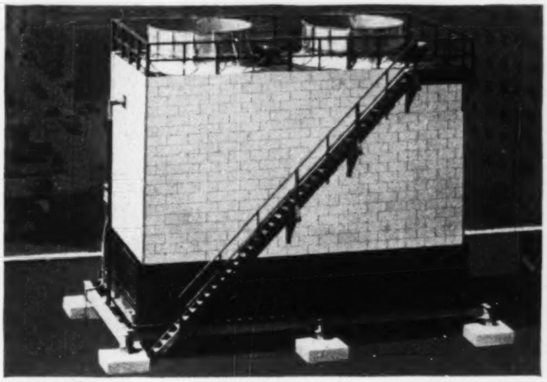
MAXIMUM PERFORMANCE

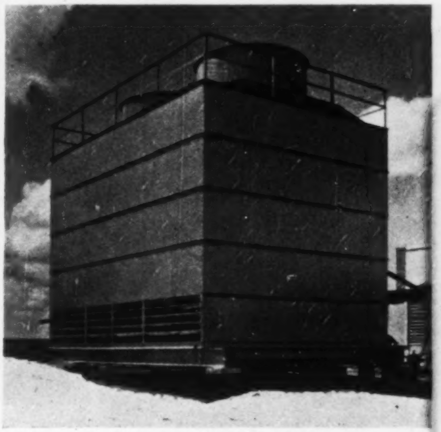
***for* MINIMUM SIZE and H. P.**

THAT MEANS

COLDER WATER CHEAPER!



Asbestos Shingle Casing, Galvanized Steel Fan Rings, Fire Treated Wood Filling, Fireproof Construction erected at Dallas, Texas



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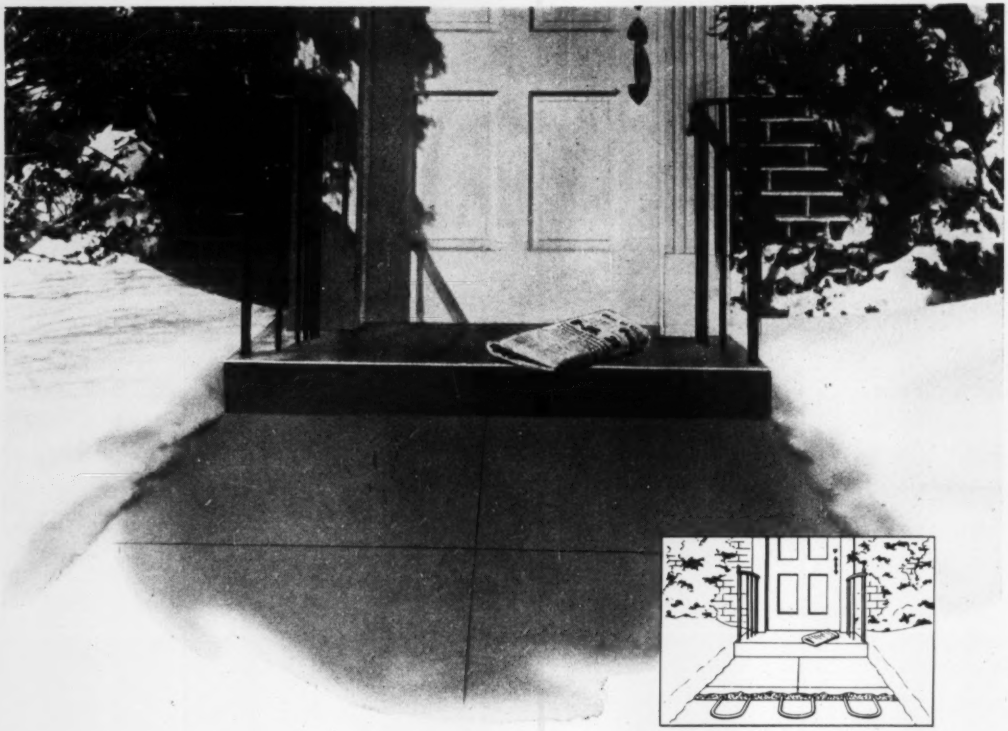
4239 Duncan Ave., St. Louis 10, Mo.

SOUTHWEST AIR CONDITIONING SHOW

DALLAS, JAN. 23-27, 1950

Mr. Smith "Slept in" this Morning!



Steel Pipe is first choice for snow melting systems

Fortunate is the man who can let *steel pipe* shovel his snow while he takes an extra "forty winks" on a blustery winter morning!

Yes, by circulating hot water through steel pipes embedded in the concrete, snow can be melted on contact, ice formations prevented, and driveways and walks kept dry and safe all winter long. More and more home and building owners, plants, airports, and institutions are installing such systems.

Steel Pipe is the first choice, for good reasons. Not alone in slab heating for snow removal, but in the similar service of Radiant Heating for interiors as well . . . because *steel pipe* has been *proved* for more than 60 years in the transmission of steam and hot water for conventional heating purposes.

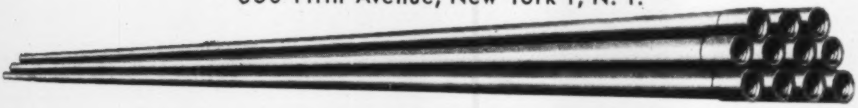
Economical to begin with, easy to form and weld, expansion co-efficient the same as concrete and plaster, durable beyond the life of the structure . . . *steel pipe* embodies all the characteristics necessary to successful installation and operation!

Driveways, too, can be kept clean and free from ice and snow with steel pipe coils.

COMMITTEE ON STEEL PIPE RESEARCH

OF AMERICAN IRON AND STEEL INSTITUTE

350 Fifth Avenue, New York 1, N. Y.



THESE CHILLED WATER LINES are being insulated with PC Foamglas to prevent condensation. Foamglas is available in preformed sections for standard pipe sizes and fittings, in flat blocks for buildings, and in curved segments and beveled lags for processing equipment.

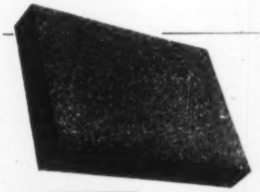
"What can PC Foamglas Insulation do for me?"

● PC Foamglas is the proven, *permanent* insulation for a wide range of temperature applications. It helps to maintain desired temperature levels; minimizes condensation — without maintenance, repairs or replacements. Moreover, PC Foamglas helps to increase the efficiency of air-conditioning systems, thus effecting additional reductions in operating costs.

PC Foamglas is widely used on both hot and cold piping—indoors and outdoors—as well as on industrial processing equipment. It's extremely efficient also for insulating roofs, walls and floors in all kinds of buildings. A true glass, it is moistureproof, fireproof, verminproof. It is resistant to fumes, acid atmospheres, vapors and other elements that so often cause deterioration of other insulating materials. And when installed according to our specifications for recommended applications, it retains its original insulating efficiency permanently.

But there is a lot more to tell you about PC Foamglas. So, why not fill in and return the convenient coupon for our free booklets? They're packed full of information and illustrations, giving you a clear idea of what PC Foamglas Insulation can do for you.

YOU ARE INVITED **to visit us at the Southwestern Air Conditioning Exposition, at the State Fair Grounds, Dallas, Texas— January 23 to 27. BOOTH NO. 127.**



This is FOAMGLAS®

The entire, strong, rigid block is composed of millions of sealed glass bubbles. They form a continuous structure, so no air, moisture, vapor or fumes can get into or through the Foamglas block. In those closed glass cells, which contain still air, lies the secret of the material's permanent insulating efficiency.

For additional information see our inserts in Sweet's Catalogs

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Without obligation on my part, please send me your FREE booklets on PC Foamglas Insulation for:

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FOAMGLAS INSULATION

...when you insulate with FOAMGLAS...you insulate for good!

2 New Auto-Vents by Maid-O'-Mist, Inc.

PAT No 2106512-2270...
No 67 AUTO-VENT
PATS PEND
MAID-O'-MIST INC
CHICAGO, ILL

for Hot Water Heating Systems

No. 67 AUTO-VENT (Float Operated) for continuous venting of Hot Water Heating Systems

When space for air valves is limited, the new No. 67 Auto-Vent is the answer. Its small overall size ($3\frac{3}{16}''$ x $1\frac{1}{2}''$ with $\frac{1}{8}''$ I.P. thread) allows its installation in trouble spots previously neglected or improperly vented. Built entirely of non-ferrous metals. For use on hot water systems up to 30 lbs. pressure. No air chamber is required. Send for catalog sheet No. 67F.

List price $3.50

◀ *Use the No. 67 on Hot Water:* Convector Radiators • Baseboard Radiation • Radiant Panels.

No. 72 AUTO-VENT—the fastest venting valve (Expansion Type) on the market!

Due to the unique construction of the new No. 72 Auto-Vent, all expansion and contraction of the special composition disk is confined to 4 vent slots rather than around the entire seat of the valve. This plus its internal siphon tube makes it the fastest venting valve (expansion type) on the market for hot water heating. Send for catalog sheet No. 72F.

List price $1.50

Use the No. 72 on Hot Water: Convector Radiators • Baseboard Radiation • Free Standing Radiators.

Maid-O'-Mist, Inc. has pioneered in the development of efficient devices for automatically venting air and gas from Hot Water heating systems. The famous No. 7 Auto-Vent has for years been accepted as one of the most successful, inexpensive means of venting overhead mains, trapped pipe lines, radiation etc., and hot or cold liquid circulating systems.

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AUTOMATIC HUMIDIFIERS . . . . . AUTO-VENTS
WATER LINE CONTROLS . HEATING SPECIALTIES
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A&R Products for–

Air Conditioning • Humidifying • Dehumidifying

Cooling • Scrubbing • Air Washing • Air Purification

CAPILLARY AIR CONDITIONERS

A standard Factory Insulated Size 6-5 Class 1 Capillary Central Station Air Washer. Normal capacity 30,000 cfm.

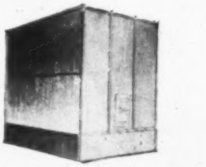
The Capillary Air Conditioner, designed to act as an air washer, dust arrester, humidifier, cooler and dehumidifier, depends on the new and far more efficient principle of dividing *both* the water and air of the system into fine streams flowing together through low resistance channels. It provides the most intimate and efficient contact between air and the cooling, moistening or cleaning fluid with unique economies in operating costs.

For most purposes, a Capillary Air Washer requires only 1/3 the volume of water at 1/3 the pumping pressure used by conventional equipment. These Capillary conditioners are available with casings and tanks factory insulated for central station air conditioning applications.

CAPILLARY UNIT CONDITIONERS are factory insulated and assembled, ready for use. They include fan, motor, drive, heating coils, Capillary Cells with suitable sprays, spray pump and mixing dampers. Units are designed for floor mounting or ceiling suspension, and can be arranged for the reception of cooling coils if required.

Capillary Air Conditioners are covered in complete detail in Bulletin G-3.

SPRAY TYPE AIR WASHERS



Standard A & R Spray Type Washer — Factory Insulated.

A & R Type S Air Washers conform to the usual basic design of spray washers, with many special features developed to insure more efficient and more dependable operation, lower maintenance costs and in most cases, lower installation costs. Unique design features include more efficient and more easily handled eliminators; collecting tanks which are much more readily cleaned; flooded entering baffles for excessively dirty air and more effective nozzle arrangement.

Type S Air Washers can be supplied with factory insulated casings and tank for central station applications.

Bulletin AW-1 provides complete description and engineering data.

SPRAYED COIL DEHUMIDIFIERS

A & R Sprayed Coil Dehumidifiers for year-round treatment of air are complete with water type or direct expansion cooling coils, sprays, circulating pump and glass mat eliminators. They are factory insulated complete units ready for speedy field assembly. Special design features insure continuous washing and cleaning of finned surfaces and easy accessibility of parts.

See Bulletin SC-1 for complete data.

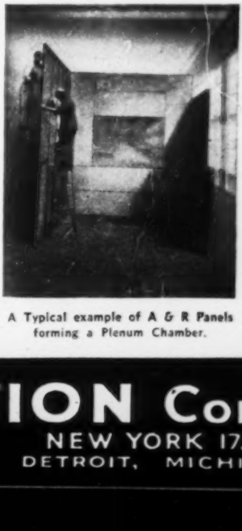
ARTICULATED UNITS

No matter how large the air conditioning system, A & R can supply an integrated or articulated control apparatus to meet specific needs. Where equipment is of such size that it cannot be shipped assembled, the importance of using matched and integrated central station conditioners, heating and cooling coils, fans, motors, drives, automatic dampers, fan housing and air inlet chambers, ready for assembly, cannot be over-emphasized. Over-all cost is materially reduced, while the responsibility for delivery and performance rests on one purchase order to one organization.

A & R INSULATED PANELS

These factory-produced panels consist of insulation between a metal sheet on one side and hard fiber board on the other, the three elements being laminated and cemented together under pressure. Their design includes the structural frame to form units which require only bolting together to make enclosures of any required shape for plenum chambers, air washers and many other purposes. Panels are available in widths from 3″ to 48″, and in lengths up to 12′. Their use insures tremendous economies in field labor

For details see Bulletin P-1.



A Typical example of A & R Panels forming a Plenum Chamber.

AIR & REFRIGERATION CORP.

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Cordially invites you to visit

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Controls will be exhibited — Staff Engineers in attendance

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*Auspices ASHVE

for the best in AUTOMATIC CONTROLS

Wherever there is a *need for automatic controls* . . . in heating, refrigeration, aircraft or industry . . . whether for product or process . . . there is a *better* General Control for the job. So whatever your *control problem,* check with General Controls first. Contact us at the Dallas Convention . . . at the Factory or any of the 21 Factory Branch Offices conveniently located from Coast-to-Coast. And remember . . . that in the field of Automatic Controls . . . General Controls *do more* and *cost less!*

check this complete line!

GENERAL CONTROLS

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Manufacturers of Automatic Pressure, Temperature, Level and Flow Controls

WHO WOULD DARE TO GAMBLE WITH HER SAFETY?

On one thing everyone is united: protection of the school age youngster. Woe unto the man who would gamble on the safety or health of the boys and girls who hold the promise of tomorrow!

But despite the fact that old America is solidly united on the need for protecting young America, some hazards, less obscure but no less real than traffic, fire or health dangers, are sometimes overlooked.

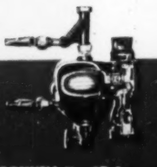
An excellent example is the unprotected heating or power boiler in school buildings. It is the duty of every heating man to point this out to the proper authorities.

No field is more receptive to your counsel. No field offers you a better opportunity to be of real service to your community.

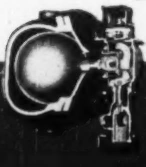
There is a McDonnell boiler water level control for every type and size of boiler found in school plants, operating at any pressure up to 150 lbs. A number of them are illustrated here. Ask for latest condensed catalog.

McDONNELL & MILLER, INC., 1316 Wrigley Bldg. Chicago 11, Ill.

Doing One M&M SAFETY CONTROLS *Thing Well*



McDONNELL No. 47-2 [illegible]



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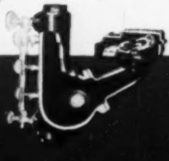

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McDONNELL *Boiler Water Level Controls*

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EXPORT

OILFIELD EQUIPMENT COMPANY—NEW YORK, N. Y.

WEBSTER BURNERS
and CONTROLS

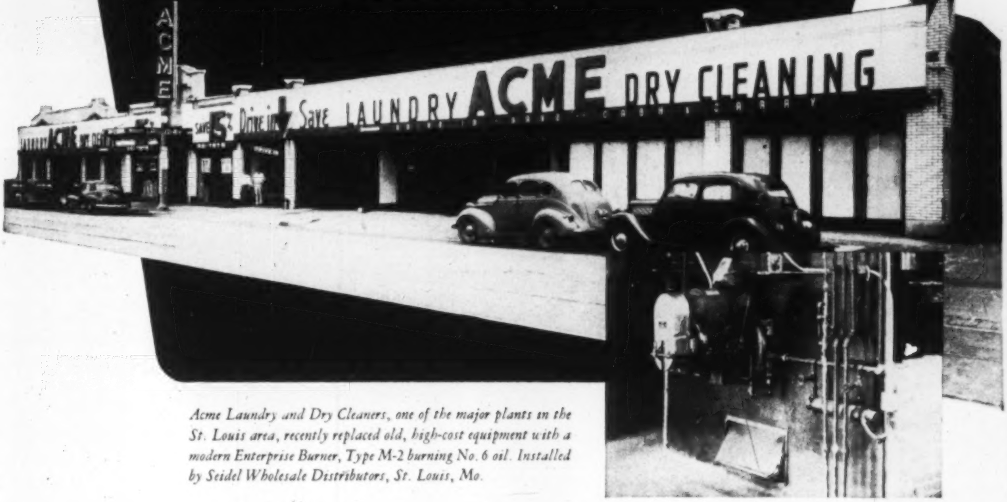
Offer your customers, large or small, a Webster Engineered Combustion Installation—from the most complete line of standard burners available from a single manufacturer.

Webster Burners and Controls are available for practically every industry where gas is used as fuel.

Webster Equipment is marketed through the firms listed above. Their engineering service departments welcome the opportunity to work with you on combustion installations. Write for Bulletin B1.

THE WEBSTER ENGINEERING CO.
P. O. BOX 2168 - TULSA, OKLAHOMA
Division of Surface Combustion Corp., Toledo, Ohio

Leading Laundries, too, cut costs, Increase Efficiency with Modern **ENTERPRISE** Burners



Acme Laundry and Dry Cleaners, one of the major plants in the St. Louis area, recently replaced old, high-cost equipment with a modern Enterprise Burner, Type M-2 burning No. 6 oil. Installed by Seidel Wholesale Distributors, St. Louis, Mo.

You can well imagine the importance attached to heating equipment in a plant like this, where 80,000 pounds of laundry and dry cleaning pour through each week. Heavy, continuous demands for steam and hot water require not only top efficiency and performance of burner equipment, but low fuel and maintenance costs. On all counts the Enterprise M-2 Oil Burner, in operation at Acme well over a year, has achieved enviable records: low cost with high BTU value; almost 3,000 operating hours without a shut-down for maintenance or repairs.

The same excellent burner service is available in Enterprise's complete line of heavy-duty Oil and Combination Oil and Gas Burners. Write for full information—your inquiry will receive our prompt and careful attention.

Choice of Heating Experts . . . Everywhere

Specify
ENTERPRISE Burners

BURNER DIVISION OF ENTERPRISE ENGINE & FOUNDRY CO.
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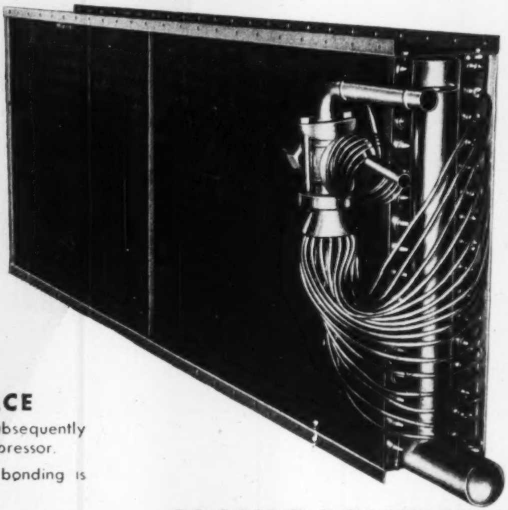
*We can't make **all** the*
Heat Transfer Surface
*So we make the **Best** of it*

ONLY KENNARD *Engineered* COILS

Give You so Much...



CLEANER INSIDE SURFACE

Hydraulic stretching loosens scale and oxides subsequently blown OUT of coil reduces danger of scoring compressor.

SAFER COIL—Having withstood 3000 psi for bonding is safe-guarded against leaks.

UNIFORM EVEN STRESS—in ALL fins—good mechanical and thermal bond

NITROGEN ATMOSPHERE BRAZING

All header and distributor tube joints to the coil are phos-copper brazed in an inert Nitrogen Atmosphere to eliminate abrasive scale.

NO-RUST FRAMES

Frames up to 72" are ALUMINUM Larger sizes framed in steel, hot-dipped galvanized AFTER FABRICATION.

ONE-PIECE FINS *(ALL LENGTHS)*

Solid plate type fin for ALL coils. Reduces air resistance Requires less fan power. Minimizes fuzz and lint fouling.

*Underwriters Laboratories Approval**

*Does not apply to water and steam coils — not required

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We are equipped to fabricate ANY type of Heating or Cooling Coils (any refrigerant) on prompt delivery schedules. Your inquiries are invited.

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No. 47A—FINNED COILS
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"Refinement of Detail Marks the Difference Between Ordinary and Excellent"

KENNARD CORPORATION

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ALL YOUR QUESTIONS ANSWERED about correct steam trapping

Here's a book that is especially prepared to answer all your questions about correct trapping of steam lines. Filled with helpful reference data, "Solving Steam Trap Problems" saves your time and money by giving you easy-to-follow formulas for proper trap selection. This book also contains many helpful hints on how to keep equipment at top efficiency by removing all condensate and air, as well as how to install and service traps. This valuable book is yours without cost. Simply attach coupon to your business letterhead and mail.

Solving
STEAM TRAP
PROBLEMS
FREE
MAIL COUPON
BELOW

HOW CAN I SELECT THE RIGHT TRAP FOR ANY INSTALLATION?

This 36-page book makes it easy to specify the correct steam trap. You'll save time and money by being able to determine the right trap for any installation in just a matter of minutes.

HOW MANY FITTINGS CAN I SAVE PER INSTALLATION?

It is no longer necessary to use three elbows and four nipples for the average steam trap installation. "Solving Steam Trap Problems" shows how to install a trap with a single fitting, saving 60 minutes of installation time.

WHY IS IT IMPORTANT TO TRAP UNIT HEATERS?

Learn how to get maximum heat from unit heaters! The heat delivery of a unit heater depends, among other things, on how completely the steam compartment is filled with dry hot steam. The correct method of trapping unit heaters to obtain maximum efficiency is fully explained.

WHAT IS FLASH STEAM?

Flash steam is frequently mistaken for live steam and a steam trap condemned when it is still satisfactory. You'll find a complete explanation of flash steam and how to distinguish from live steam.

ALSO HOW CAN I DETERMINE THE RIGHT TRAP FOR

- Pipe Coils and Heating Surfaces in Still Air
- Fan System Heating Surfaces
- Steam Jacketed Kettles
- Autoclaves
- Submerged Surfaces
- Hospital Equipment
- Kitchen Equipment
- Laundry and Dry Cleaning Equipment
- and many others.

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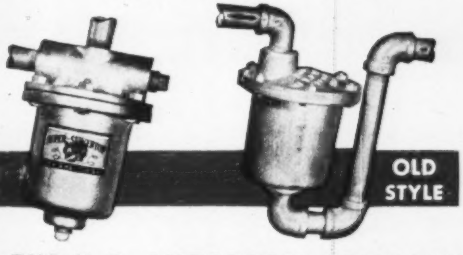
1949 WEST 96TH STREET • CLEVELAND 2, OHIO



USE SUPER-SILVERTOP IN-LINE OR AS AN ELBOW

OLD STYLE

Save Money With SUPER-SILVERTOPS

THE V. D. ANDERSON COMPANY
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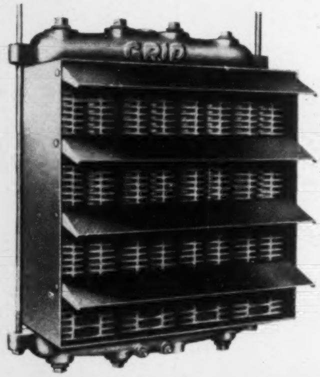
Gentlemen: Please send without obligation your book "Solving Steam Trap Problems."

Name ....
Address ....
City .... State ....

In Canada: Bowden Machine Co., Toronto

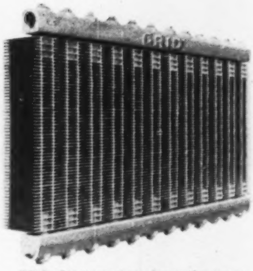
UNIT HEATERS *and* BLAST COILS

T. M. REG.
U. S. PAT. OFF.



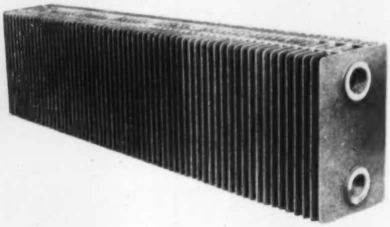
GRID Unit Heaters are designed for low outlet temperatures and greater air delivery to the floor line—not the ceiling—and will safely withstand steam pressure up to 250 P.S.I. without reducing valves. They save fuel cost, too, because they provide heat where it is most needed—to the working zone. Careful selection of fans and motor speeds eliminates stratification of warm air at ceiling level.

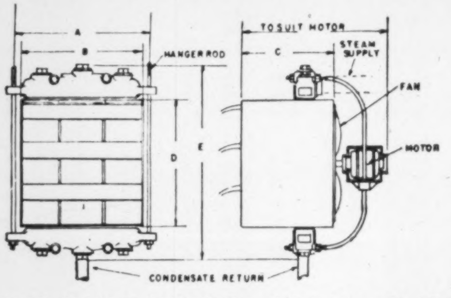
No other type unit heater has their lasting qualities . . . they will have the same high efficiency after years of operation as the day they were installed.



GRID Blast sections have the same high efficiency and lasting qualities as GRID Unit Heaters . . . no tortuous air passages . . . complete absence of ruptures, strains, and warping . . . guaranteed for steam pressures up to 250 lbs.

CAST IRON HEATING SECTIONS
ONE PIECE CONSTRUCTION – No Soldered, Brazed, Welded or Expanded Connections . . . . . .





Overall dimensions for installation of Cast Iron GRID Unit Heater

THE GRID UNIT HAS THESE ADVANTAGES

- Low maintenance expense.
- More air changes per hour.
- Lower outlet temperature.
- Larger air volume.
- No electrolysis to cause corrosion-leaks or breakdowns.
- One-piece construction—no soldered, brazed or expanded connections.
- Positive "directed" heat.
- Open design that keeps units clean.

CI (CAST IRON) SERIES GRID UNIT HEATER DATA

Model No.	Dimensions					Motor		Vol. Fan CFM	Capacities 5 PSI Steam 60°F Air		Pipe Size		Support Rod Dia.	Approx. Ship. Weight Lbs.
	A	B	C	D	E	HP	RPM		Btu/ Hr.	Final Temp. °F	Supply	Return		
CI-1000	11⅝	13⅝	12¼	9¾	15½	1/25	1550	572	29,080	106	1¼	1¼	⅜	150
CI-1200	14⅞	16⅞	12¾	12¾	18½	1/15	1550	798	45,450	112	1¼	1¼	⅜	210
CI-1500	17½	15⅜	11½	16	23⅞	1/8	1750	1500	76,500	107	1½	1¼	½	280
CI-1520	17½	15⅜	11½	21	28⅜	1/8	1750	1700	101,500	114	1½	1¼	½	390
CI-2000	22⅛	20 9/16	11⅞	21 1/16	28⅜	1/6	1150	2600	143,000	110	2	1¼	½	490
CI-2025	22⅛	20 9/16	11⅞	25⅞	35¼	1/6	1150	2875	173,640	115	2	1¼	½	520
CI-2500	27½	25⅞	13	25⅞	35¼	1/2	1150	4350	224,000	107	2	1¼	⅝	700
CI-2504	27½	25⅞	13	25⅞	35¼	1/4	1150	3300	206,000	117	2	1¼	⅝	660
CI-2530	27½	25⅞	13	31	40½	1/2	1150	4650	275,800	114	2	1¼	⅝	900
CI-3000	32⅝	31	13	31	40½	1/2	850	6300	332,000	108	2½	1¼	⅝	1020
CI-3000	32⅝	31	13	31	40½	1½	1150	8000	380,000	103	2½	1¼	⅝	1070

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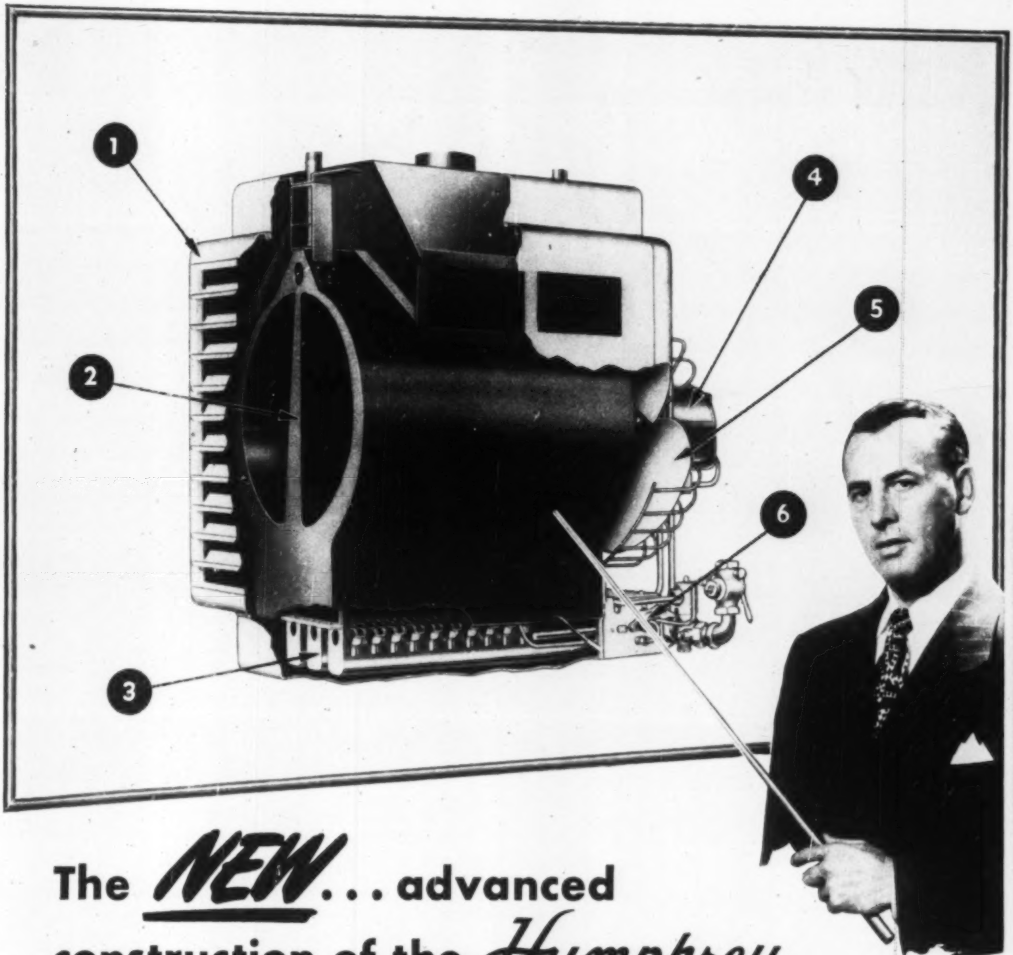
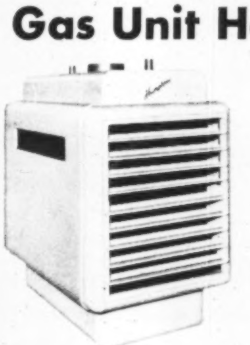
D. J. MURRAY MANUFACTURING CO.

WAUSAU, WISCONSIN

Write for complete catalog information on GRID Unit Heaters, GRID Blast Coils, and GRID Radiation.



The *NEW*... advanced construction of the *Humphrey* Gas Unit Heater *INCREASES YOUR SALES!*



Incorporating all the sound engineering principles, always characteristic of Humphrey appliances — PLUS startling newness in styling, burner design, heat exchange methods, safety controls, and many other features — Humphrey gas unit heaters assure the user maximum performance and comfort for every cubic foot of gas burned.

1. **Rich Ivory finished casing. Smooth — dust resisting.**
2. **"Free-Flow" heat exchanger. Requires no cleaning.**
3. **Super combustion burner. Stainless steel burner tips.**
4. **Resilient mounted motor. Rugged, dependable.**
5. **Statically and dynamically balanced fan. Quiet.**
6. **Positive safety controls. Standard on all models.**

Write for complete literature and prices.

GENERAL GAS LIGHT COMPANY

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Cancer's danger signals

1. Any sore that does not heal
2. A lump or thickening in the breast or elsewhere
3. Unusual bleeding or discharge
4. Any change in a wart or mole
5. Persistent indigestion or difficulty in swallowing
6. Persistent hoarseness or cough
7. Any change in normal bowel habits

Can be your safety signals

Cancer is curable if discovered early and treated properly

If any of these symptoms appear, see your doctor *at once*.

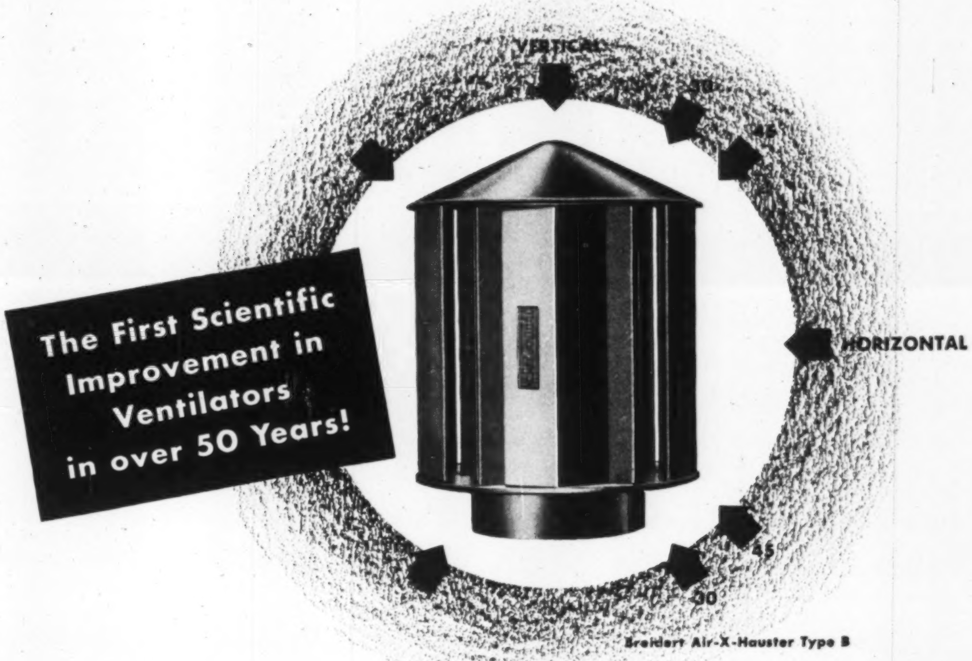
Write for the booklet about cancer. Just address your request to "CANCER".

AMERICAN CANCER SOCIETY, INC.

WHO
WHAT
WHY
WHERE
WHEN
Cancer

CAUTION to Ventilator Buyers

If you want to *be sure* of what you're getting when you buy ventilators, insist on *certified* capacity ratings based on tests made with wind blowing in *all* directions, as indicated below.


VERTICAL
30
45
HORIZONTAL
45
30
The First Scientific Improvement in Ventilators in over 50 Years!

Breidert Air-X-Hauster Type B

Only such tests can guarantee the capacities a ventilator will deliver under actual operating conditions! Don't be misled into buying on size alone. Insist on the correct size for the capacity required.

The Breidert Air-X-Hauster has been tested by the Pittsburgh Testing Laboratory, San Francisco (formerly Smith, Emery & Co.) with wind directed at *all* angles shown above. It is the *only* ventilator on the market with certified ratings based on such tests. Thousands of Breiderts are in use on industrial, commercial and residential buildings all over the country, and on most types of pleasure craft and ships.

For detailed information and free Engineering Data Book on the Breidert, send the coupon.

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LEADING ARCHITECTS & ENGINEERS SPECIFY

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THERMOSTATIC TRAPS

MODULATION VALVES

BECAUSE they know the Barnes & Jones reputation for manufacturing Steam Specialties up to a QUALITY, not down to a price.

For 47 years our know how has been applied to Vapor and Vacuum Heating Systems and Equipment. That's why we say: "When you want Steam Specialties, Come to the Specialists."

RADIATOR VALVES—*Series F Quick Opening Type*
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Series H Adjustable Orifice

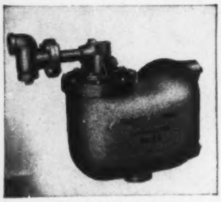
THERMOSTATIC RADIATOR TRAPS—*Low, Medium and High Pressure, all sizes.*

FLOAT & THERMOSTATIC TRAPS—*Low Pressure & Medium Pressure.*

BOILER RETURN TRAPS (Condensators)—*Up to 6,000 square foot capacity.*

ORIFICE VALVES

F & T TRAPS



BOILER RETURN TRAPS

OUR TOUGHEST CUSTOMER IS IN OUR OWN PLANT. Not just one in a lot but EVERY single Barnes & Jones Trap, Valve & Condensator is fully tested for guaranteed performance under operating conditions far more severe than any to be encountered in the field.

Write today for our Catalog No. 76 which describes our complete line of "Steam Specialties by Specialists."

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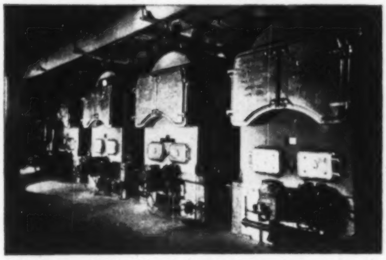
FITZGIBBONS
heats the big jobs!

PRUDENTIAL BUILDING LOS ANGELES

One of the finest and largest on the Pacific Coast



The Prudential Building boiler room
Architects: Walter Wurdeman and Welton D. Becket, Los Angeles
Consulting Engineer: Ralph E. Phillips
General Contractor: The William Simpson Construction Co., Los Angeles
Heating Contractor: Western Air & Refrigeration Inc., Los Angeles

FIVE FITZGIBBONS STEEL BOILERS were selected to serve this new and beautiful milestone of Western development, designed as a store and office building with every modern feature of convenience and utility. Four of the Fitzgibbons "D" Type steel boilers provide heat for seasonal needs, while the fifth supplies service hot water throughout the year.

The best buildings deserve "the best in steel boiler heat"—The Fitzgibbons Boiler.

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Consult our Catalogue in Sweet's File – 1949 Issue, or write for full details.

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Fitzgibbons Boiler Company, Inc.
101 PARK AVENUE, NEW YORK 17, N. Y.

H.P.A.C.—JAN., '50

Send me the "D" TYPE Boiler Catalog.

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YOU will find much to see and profit from at the Southwest Air Conditioning Exposition. That's why we remind you now to be sure to visit the Mundet booths. It will pay you to get the latest information on Mundet insulation products for low or high temperatures, and Mundet contract installation services. New manufacturing facilities offer exclusive benefits to insulation users. Mundet Cork Corporation, Insulation Division, 7101 Tonnelle Avenue, North Bergen, N. J.

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BOTH LOW AND HIGH TEMPERATURES

This beautiful new home was recently built for Mr. C. L. Klingaman, of Gary, Indiana. Mr. Klingaman, a heating contractor, knows his heating systems. Because he knows heating systems, he chose to have his home heated by ceiling panel radiant heating coils. And because he knows materials, he specified Bundyweld Radiant Heating Tubing for these coils.

Better radiant heating in better homes with Bundyweld Tubing

It's natural to find Bundyweld Tubing used more and more by builders, in radiant heating panel installations.

For *no other tubing can match all the advantages Bundyweld offers.*

Made by a patented process, Bundyweld is double-walled for extra strength and sturdiness. No more crushing or denting in installation; Bundyweld takes the slams and shocks right in stride. It's thinner walled, too, for maximum heat conductivity.

Soft soldering or brazing is easily accomplished right on the job. Lightweight Bundyweld grids can be positioned quickly by two men, and plastering and painting offer no headaches.

You'll want Bundyweld Tubing for better radiant heating in *your* better homes. Check this miracle tubing before your next job. For further information, write: ***Bundy Tubing Company, Detroit 14, Michigan.***

"We'll see you at the Southwest Air Conditioning Exposition."

BUNDYWELD
STEEL TUBING
FOR
TOP PERFORMAN
IN RADIANT HEATING

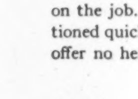
HERE IT IS!

Bundyweld's new Radiant Heating book, crammed with the latest, most complete information about Bundyweld radiant heating installation and applications. Write us, we'll be glad to send you a copy.

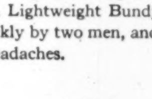
Bundyweld® Tubing

DOUBLE-WALLED FROM A SINGLE STRIP

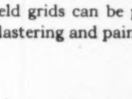
WHY BUNDYWELD IS BETTER TUBING



Bundyweld starts as a single strip of basic metal, coated with a bonding metal. Then it's . . .



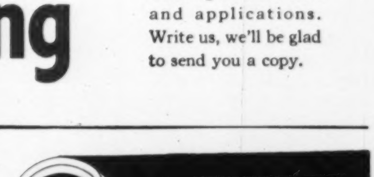
continuously rolled twice around laterally into a tube of uniform thickness, and



passed through a furnace. Bonding metal fuses with basic metal, presto—

SIZES UP TO 5/8 O.D.

Bundyweld . . double-walled and brazed through 360° of wall contact.



SIZES UP TO 5/8" O.D.

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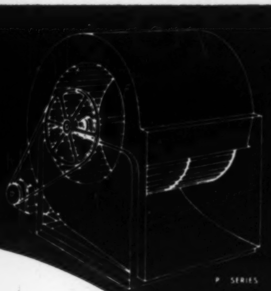


P SERIES

. . . and now
The HORIZONTAL
Brundage AIR-RENEWER

FRESH AIR CLEAN AIR—PROPERLY HUMIDIFIED—BACTERIA FREE

S SERIES

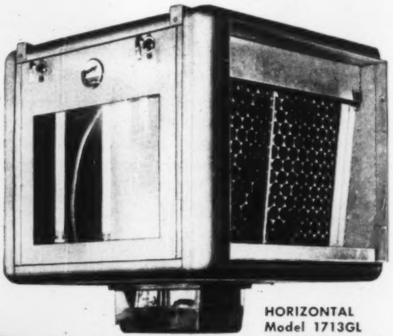
For the forced warm air furnace a ceiling type (horizontal) Air-Renewer has been created. Air humidification, purification and cleaning can be had by installing the glycol-filter compartment unit (illustrated below) with any heating or cooling system where a blower is already an integral part of the system. It is completely factory assembled, space saving and dollar saving to your customer. This low cost, easily installed unit, employs a simple, positive, trouble-free mechanical process.

Get all the facts now about this fast-growing market. Learn how you can make bigger profits in 1950 installing complete indoor living comfort—the Brundage Air-Renewer!

AIR CIRCULATION

Where a blower is not part of the system a 700 Series Vertical Model (Floor Type) may be used, or a matching blower compartment may be added to the horizontal Air-Renewer.

100 SERIES



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AIR-RENEWER

Brundage COMPANY

Blower Specialists Since 1919

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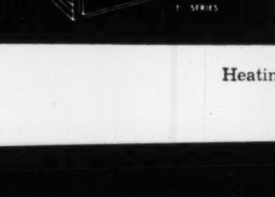
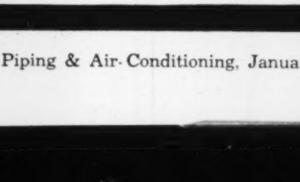


T SERIES



Typical installation, with a 100,000 B.T.U. forced warm air furnace.

GET A FREE SAMPLE OF THIS AMAZING NEW FILTER MEDIA!

An Inspection Will Convince You of Its Outstanding Superiority

Until you've actually *seen* Continental's amazing new air-filter media, you'll never appreciate its *spectacular* advantages over conventional metal, glass or fibre media. For your own sake as well as ours we therefore ask that you let us *send you a sample.*

Patent Applied For

ADVANTAGES IN Washable Unit Filters

Lower resistance to air flow, higher cleaning efficiency, greater dust-holding capacity, high velocity, easier servicing.

Lower Resistance. Initial resistance to air-flow is extremely low (.08 for 2″ filters and .12 for 4″ filters) and does not increase materially as dust is accumulated. *Result:* Unlike most washable unit filters, the volume of air the Ezwash delivers is comparatively constant, regardless of accumulated dust.

Higher Cleaning Efficiency. By the Target method of testing, the average efficiency of 2″ Ezwash Filters is 97% and that of a 4″ filter is 98%.

High Velocity. Each 20 x 20 filter has a normal rated capacity of 1200 CFM as compared to 800 CFM for most conventional unit filters. *Result:* Lower installation cost—less space required—fewer filters to service.

Easily Serviced. Because of the large size, rounded contours and smoothness of the Ezwash air passages, the filter can be quickly and thoroughly *cleaned with an ordinary hose using cold water.* There are no sharp wires or "fish hooks" on which lint can become permanently snagged.

For Old or New Installations. Ezwash filter cells may be used as replacements for old-type cells in existing air filter systems and air washer installations.

ADVANTAGES IN Automatic Filters

Low resistance to air flow, high efficiency, positive self-cleaning because the larger air passages are easily reached and flushed by the cleaning oil. (See Unit Filter advantages.)

ADVANTAGES IN Air Washers

High humidifying efficiency because the air and water are brought into intimate, scrubbing contact — this also accounts for high *cleaning* efficiency. Large air passages prevent plugging up with dust and algae. Permanent — cells should *last* from ten to twenty years. (See Unit Filter advantages.)

The coupon will bring you a free sample of the Ezwash Filter Media, together with our new bulletin giving specifications, sizes, etc. Mail it today — no obligation, of course.

CONTINENTAL AIR FILTERS, Inc.
Louisville, Kentucky

Continental Air Filters, Inc.
P.O. Box 1647, Louisville 1, Ky.

Gentlemen: Please send me a free sample of your Ezwash Air Filter Media and Bulletin No. 401.

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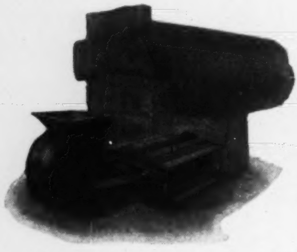
PRODUCTS AND SERVICE

Detroit Stokers are unsurpassed for economy and dependability. Both Underfeed and Overfeed Stokers of many sizes and capacities. All grades of bituminous coal are successfully burned without expensive preparation. Operating costs are low, plant efficiencies raised to new standards and capacities of present boilers increased. The purchaser is assured a Detroit Stoker, best suited to his particular boiler, kind of coal available and capacity required. Proper design and application by experienced builders produce best results.

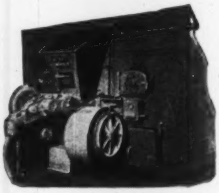


Detroit LoStoker, built to fit the furnace of Firebox Boilers. Requires no side wall or front wall brick work.

DETROIT LOSTOKER

Single retort, side cleaning adjustable plunger feed, Underfeed Stoker, mechanically driven by electric motor, or steam turbine, automatically controlled from steam pressure, water temperature or room thermostat. Compact, easily installed for all types of boilers 50 to 150 horsepower. A great coal saver.

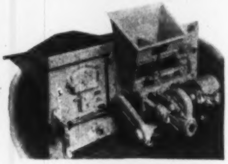
DETROIT UNISTOKER



Detroit UniStoker with Adjustable Feed provides a wide range of coal feed control.

Plunger feed, side cleaning, stoker is available in various sizes for 125 to 250 horsepower boilers. Compact, unit type, has full-housed blower, either motor or steam turbine driven, conveniently mounted at stoker front. Adjustable feed, provides for either manual or automatic coal feed control. Thousands in daily operation.

DETROIT DOUBLE RETORT STOKER

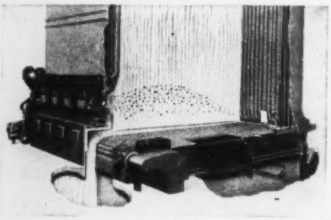


Detroit Double Retort Stoker, suited to medium sized boilers with wide furnaces.

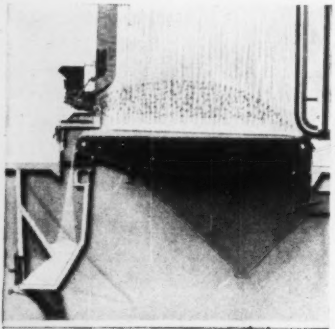
A multiple retort stoker having two retorts, with the side-cleaning feature. For medium sized boilers No basement or tunnel for ash disposal is required. Built for heavy service.

DETROIT ROTOGRATE STOKER

An advanced design of spreader stoker with FORWARD MOVING GRATES for large and medium boilers. Fine particles of fuel are burned in suspension and coarse coal, burned on the grate. Screenings or crushed run-of-mine coal are used without grinding or pulverizing. Successfully burns a wide range of fuels, such as the lower grades of Bituminous Coal and Lignites, mined in the Western States, as well as the better grades of Bituminous Coal. Fuels of high ash content are burned with higher burning rates for longer periods. Intermittent cleaning of fires or disturbance of uniform combustion is eliminated by the slow continuous FORWARD MOVEMENT OF THE GRATES that discharges the ash at the front. Combustible content of ash is usually less than two per cent.



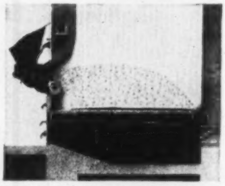
RotoGrate Stoker applied to a typical water-cooled furnace of a steam generator.



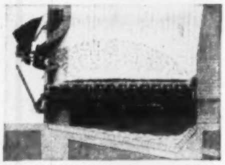
Detroit RotoGrate Stoker has a CONTINUOUSLY CLEANING FORWARD MOVING GRATE that permits higher burning rates with fuels of either high or low ash content.

DETROIT ROTOSTOKER

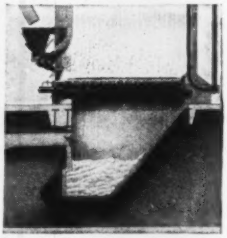
Detroit RotoStoker is spreader stoker with OVERTHROW ROTORS that distribute the fuel uniformly in the furnace. Fine particles burned in suspension. Coarse coal, burned on the grate with a comparatively thin but uniform fuel bed. Three types of grates shown are available. RotoStokers burn successfully an extremely wide range of fuels without any special preparation. Responsive to fluctuating loads, maintaining uniform steam pressure under automatic control of fuel and air supply to the furnace. Operate with high CO_2, low combustible loss in ash. Little power required for operation. Maintenance costs are negligible. In combination with coal, RotoStokers also successfully burn wood and other refuse.



Detroit RotoStoker with Stationary Grates. Ash removal is through doors at grate level.



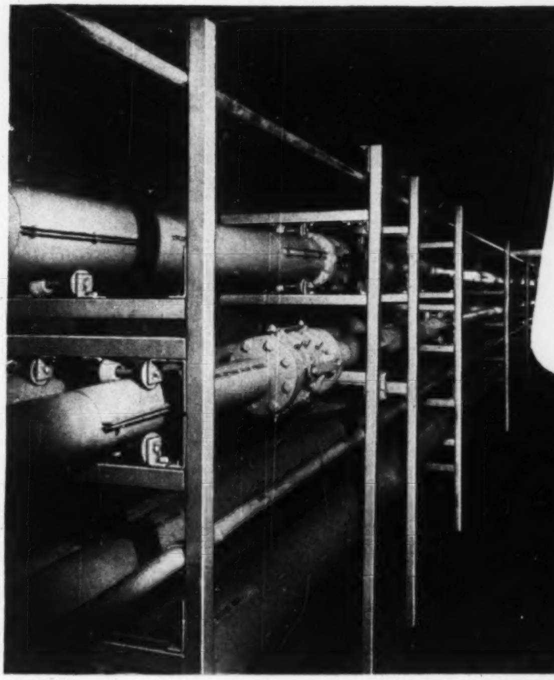
Detroit RotoStoker with Hand Dumping Grates, cleaned by releasing dumping levers at the front.



Detroit RotoStoker with Power Operated Dumping Grates, either steam or compressed air operated.

FOR TUNNEL PIPING and EQUIPMENT SUPPORTS use UNISTRUT METAL FRAMING

Completely adjustable Unistrut provides flexibility you need for right pitch or slope . . . You make adjustments, changes, additions at any time . . . reduce costs, too!



Unistrut steel channel and fittings, roller pipe supports and concrete inserts at work in a tunnel installation at G. D. Searle & Co., Skokie, Illinois, manufacturers of ethical pharmaceuticals.

● Unistrut consists of patented metal framing, spring nuts, standard parts and fittings, which in combination provide the world's most flexible method of support or suspension.

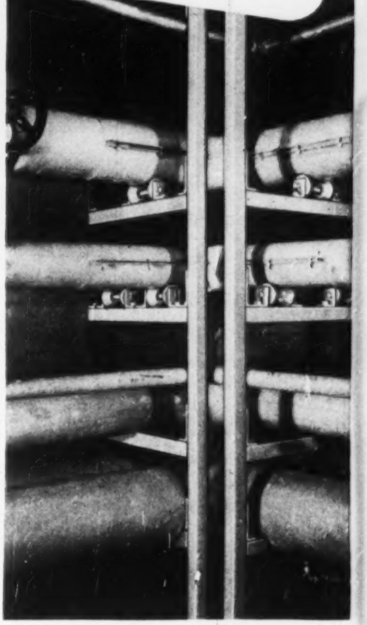
With completely adjustable and reusable Unistrut, normally difficult and complex piping runs may be installed with extreme accuracy, quickly and easily with just a hacksaw and a wrench. No drilling—no welding—no special tools or equipment!

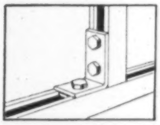
Piping runs can be installed to exactly the right pitch or slope. Adjustments and changes are easily made by the mere loosening of a nut. Additional framing may be added at any time when more piping runs are needed.

Unistrut is trim framework, providing great strength without bulk. It's easy to work with, lasts indefinitely, and the finished structure assures neat and orderly appearance.

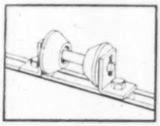
Unistrut cuts costs too. You save time in your engineering department and you eliminate the need for trained erection crews—anyone can build with Unistrut.

A trial of Unistrut on your next piping job will show you how much quicker, better and more economically the work can be done.

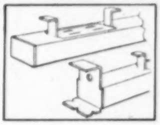




Close-up of patented Unistrut channel members, spring nuts and fittings of a type used in the Searle installation.



Unistrut single axle 2-roller pipe supports as seen in the accompanying photographs. Types available to support from 1" to 36" O.D. pipe.



This Unistrut concrete insert is the type used on the Searle job. 1600 lbs. per foot load capacity. Other sizes and styles available.

WRITE TODAY FOR FREE SAMPLE OF UNISTRUT AND THE FOLLOWING CATALOGS:

Prompt delivery from Warehouse Stocks in Principal Cities. Consult your Classified Directory.

U. S. Patent Numbers
2327587 2329815 2345650
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CATALOG 500—
24 pages on how to build frames, hangers and supports for electrical, plumbing, heating and air conditioning equipment—right on the job.

CATALOG 600—
24 pages on how to build racks of all kinds—pallet, bar stock, pipe, tube, conduit, automotive parts, hardware, furniture, floor covering, stock bin racks, and many others.

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NOW!

When Specifications Call For SQUARE Air Diffusers

You Can Install ANEMOSTAT AIR DIFFUSERS

When air diffuser specifications read "square", you can now give your customers the new square Anemostat Air Diffusers. They offer the same aspiration effect—the same draftless, uniform distribution of air—as the circular Anemostats. These new Square Diffusers, protected by patents, assure complete air diffusion *over a full 360° area.*

The new square Anemostats are available in two basic models. Type E fits without modification into the framework that holds standard size acoustical and egg crate ceilings. Type E-1 is flanged to cover the opening in a regular ceiling.

The simple snap-on method of installing these new square Anemostat Air Diffusers will save you time and labor. Both inner assembly and equalizing deflectors are just snapped into place.

Now you can install square—as well as circular and semi-circular Anemostat Air Diffusers — and be sure of top-quality performance. For full information on the new square Anemostat, write for Bulletin 29A. Bulletins on other types of Anemostats available on request.

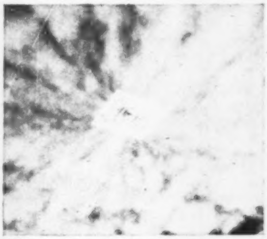
ANEMOSTAT®

DRAFTLESS *Aspirating* **AIR DIFFUSERS**

ANEMOSTAT CORPORATION OF AMERICA
10 EAST 39th STREET, NEW YORK 16, N. Y.
REPRESENTATIVES IN PRINCIPAL CITIES

"NO AIR CONDITIONING SYSTEM IS BETTER THAN ITS AIR DISTRIBUTION" AC 1239

ANEMOSTAT OFFERS COMPLETE CIRCULAR DIFFUSION *from a square outlet*

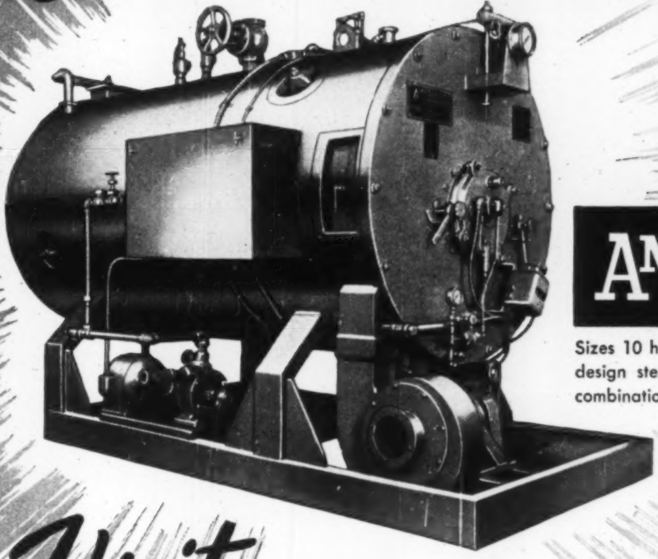


This unretouched smoke test photograph shows how the new square Anemostat diffuses air completely over a 360° area.

Only Anemostat provides effective aspiration

Due to its special design, the Anemostat distributes air of any duct velocity in a multiplicity of planes traveling in all directions. Simultaneously, the unit creates a series of countercurrents traveling toward the device which siphon into the device room air up to 35% of the supply air depending on the type and size of the unit. This room air is mixed with the supply air within the Anemostat before the air mixture is discharged into the enclosure.

See it at The Exposition . . .



AMESTEAM GENERATOR

Sizes 10 hp to 400 hp — 15 lbs. to 200 lbs. design steam pressure. Gas, oil or oil-gas combination.

Visit the Ames Display at the Southwest Air Conditioning Exposition. Learn All About These Modern, Automatic Steam Generators.

If you're attending the Exposition at Dallas, Texas, January 23rd through 27th—you're invited. We're in Booth 369. We want you to stop in and examine the Amesteam Generator on display—see for yourself the many exclusive features these superbly engineered automatic boilers offer.

If you're not going to be in Dallas at that time, you can still discover these features. Just mail the coupon below for your free copy of the new Amesteam Generator Bulletin.

AMES IRON WORKS, Oswego, N. Y.
Builders of Better Boilers Since 1848
Manufactured under license in Canada
by
VOLCANO, Ltd., Montreal, P. Q.

Ames Iron Works
Box 2000, Oswego, N. Y.
Please send me your new free bulletin on Amesteam Generators.
Name..
Company..
Address..
City........................ Zone........ State........................

What do you want most from an air filter?

It is an inescapable fact that every air filter design involves compromise. The optimum values of such factors as efficiency, pressure drop, cost, face velocity and dirt-holding capacity cannot all be incorporated in any single filter. That is why Air-Maze offers a wide selection of filter types, each engineered to provide the maximum performance for any particular design condition. Each type has been thoroughly field-proved in many installations throughout the nation. Each type is all metal—cleanable—permanent.

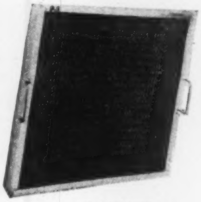
In addition to those shown below, types for railroad, maritime, aircraft, and other special applications are available. For complete information, call your nearby Air-Maze representative or write Air-Maze Corporation, 5200 Harvard Avenue, Cleveland 5, Ohio.

ELECTRONIC FILTRATION?

ELECTROMAZE FILTER

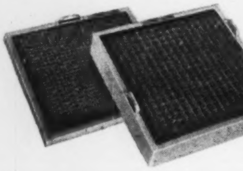
Stops smoke, pollens, and even "invisible" dust. Desk drawer construction simplifies servicing. Each cell is a complete filter. Self-adjusting power supply.

HIGH VELOCITY FILTRATION?


P-5 FILTER

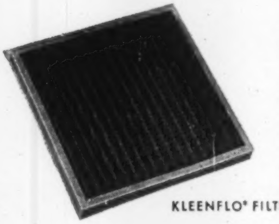
Double "V" channels permit higher air speeds at low resistance. Desirable where large air volumes must be filtered in small space.

LARGE DUST HOLDING CAPACITY?


"A" AND "B" FILTERS

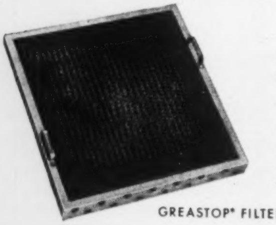
Progressive density design and more oil-coated wire baffles provide higher efficiency and greater dirt capacity. Recommended for industrial application.

LOW COST FILTRATION?


KLEENFLO* FILTER

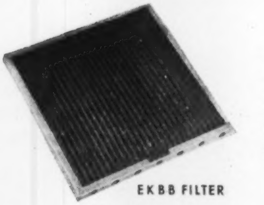
"V" crimp on approach face for expanded area. Widely used for recirculated air and lighter duty ventilating applications. Terneplate enclosing channel.

FIRE PREVENTION?


GREASTOP* FILTER

Designed to hold larger quantity of grease without clogging. Bronze or nickel-zinc plated fine mesh wire to resist corrosion from fatty acids.

WATER ELIMINATION?


EKBB FILTER

All bronze mesh in vertical crimps to collect entrained water. Used with air washers, after cooling coils, and similar applications.

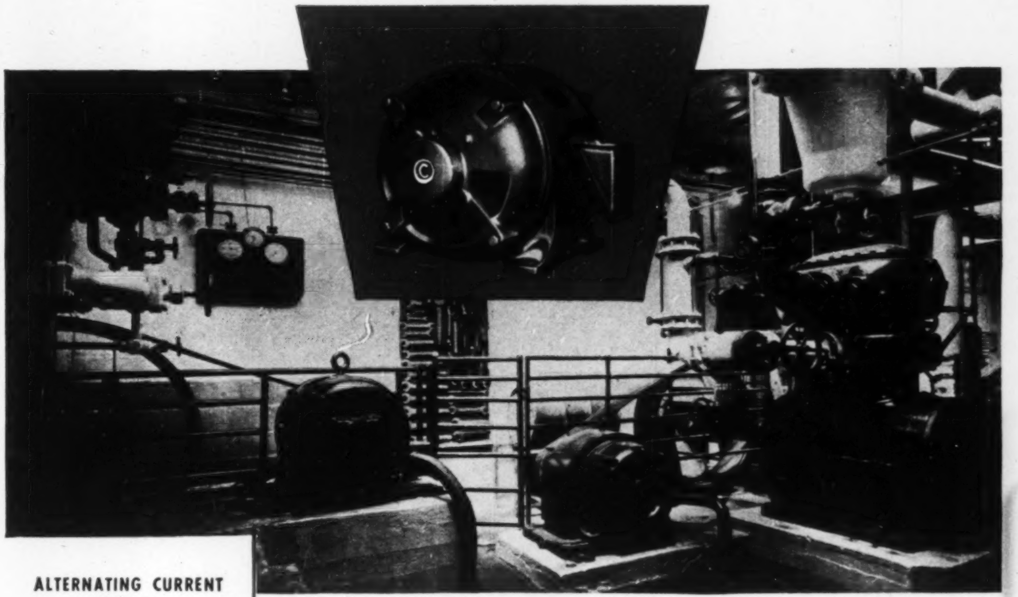
**Trade-mark Reg. U. S. Pat. Off.*

AIR FILTERS
SILENCERS
SPARK ARRESTERS

AIR-MAZE

THE FILTER ENGINEERS

LIQUID FILTERS
OIL SEPARATORS
GREASE FILTERS



Century 100 horsepower and 125 horsepower type SCH motors driving refrigeration compressors. Also in this room are 3 Century 75 horsepower motors which have been operating more than 15 years without a shutdown.

For Operating Your Refrigeration Compressors

SPECIFY Century TYPE SCH MOTORS

with HIGH STARTING TORQUE and LOW STARTING CURRENT

Century type SCH, squirrel cage motors are the ideal power supply for refrigeration compressors because they have the ability to start heavy loads with low starting current.

This means that it is never necessary to over-motor the compressor to get the starting torque needed. In fact, compared to a general purpose motor, it is often possible to substitute a Century type SCH high starting torque motor of the next lower horsepower rating.

In addition, Century motors are known for their ability to operate smoothly and quietly throughout their long service life. They are built in a wide range of types, in sizes from ⅙ to 400 horsepower for every refrigeration, air conditioning and air circulating requirement.

Popular types of standard ratings are generally available from factory and branch office stocks.

CENTURY ELECTRIC COMPANY
1806 Pine Street, St. Louis 3, Missouri
Offices and Stock Points in Principal Cities

ALTERNATING CURRENT MOTORS

POLYPHASE

Squirrel Cage Induction — ⅙ to 400 H.P.
Wound Rotor Motors — 1 to 350 H.P.
Synchronous Motors — 20 to 150 H.P.

SINGLE PHASE

Split Phase Induction — ⅙, ¼, ⅓ H.P.
Capacitor — ⅙ to 20 H.P.
Repulsion Start, Brush Lifting, Induction — ½ to 15 H.P.

DIRECT CURRENT MOTORS

⅙ to 300 H.P.

GENERATORS

AC, 500 Watts to 300 KVA
DC, 250 Watts to 200 KW

MOTOR GENERATOR SETS

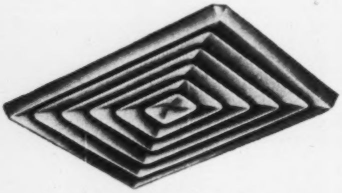
AC to DC, AC to AC
DC to DC, DC to AC

Open Protected, Splash Proof, Totally Enclosed Fan Cooled, Explosion Proof

Ball Bearing motors are factory lubricated for several years' normal service. Bearing housing construction permits easy re-lubrication when unusual service demands it.

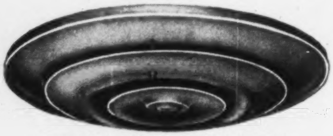
-650

SPECIFY Century C MOTORS for all your electric power requirements



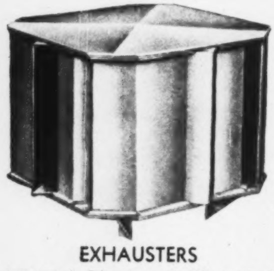
SQUARE AND RECTANGULAR AIR DIFFUSERS

Diffusion Pattern Control is in-built to permit 100% control of air distribution—with no drafts, no blank corners, no hot spots, no cold spots. Assembled from standard parts into any desired shape for ceiling, baseboard or sidewall installation.



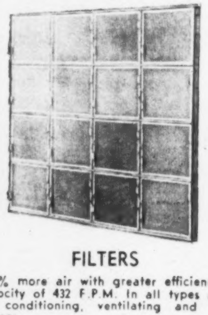
CIRCULAR AIR DIFFUSERS

Combine beautiful design with finest operating features to give rapid temperature equalization and draftless diffusion of air. In all sizes for all types of mounting and with lightning combinations.



EXHAUSTERS

Wind actuated. Exhaust up to 50% more air at average wind velocity. Will not seriously retard natural ventilation even with no breeze. Ideal for both gravity and mechanical air exhaust systems.



FILTERS

Filter 50% more air with greater efficiency at the high velocity of 432 F.P.M. In all types and sizes for air conditioning, ventilating and industrial applications.

Specify

AGITAIR

Your Assurance of QUALITY EFFICIENCY DEPENDABILITY

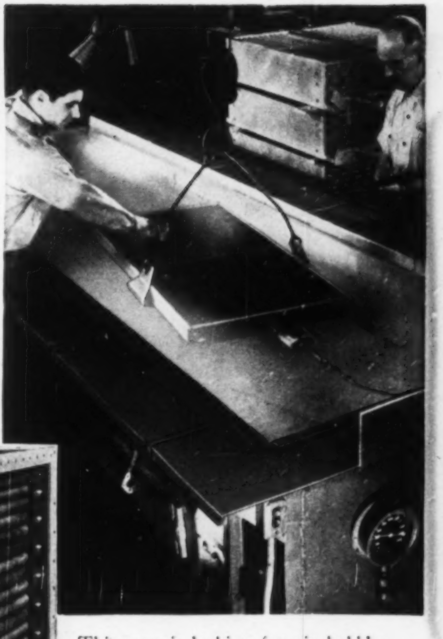
Write for Complete Literature

AIR DEVICES, INC.

17 EAST 42nd STREET • NEW YORK 17, N. Y.

Serving the Heating, Ventilating, Drying and Air Conditioning Industries

Figure it at 100% FULL RATING

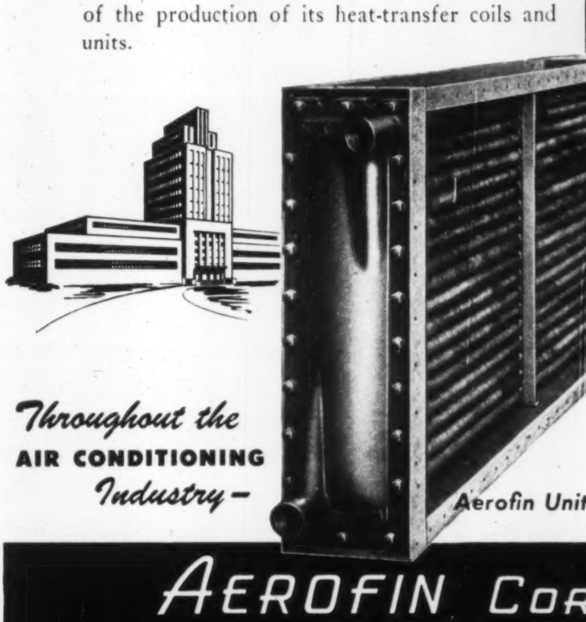


AEROFIN RATINGS ARE ACCURATE AND RELIABLE

Aerofin's continued research has developed accurate ratings that are good for the life of the unit. You can always count on Aerofin to deliver full-rated capacity — full efficiency.

Over 25 years' experience, combined with unequalled production facilities, enables Aerofin to select just the right surface and materials for each particular job. Aerofin rigidly controls every phase of the production of its heat-transfer coils and units.

This man is looking for air bubbles — he is testing Aerofin heat-transfer coils with air pressure in a specially illuminated tank. If there are no bubbles, it means the immersed Aerofin unit has withstood the severe strains of steam and hydrostatic pressure tests and is ready to give you long, efficient service.



Throughout the **AIR CONDITIONING** *Industry —* *Aerofin Units do the Job Better, Faster, Cheaper*

AEROFIN CORPORATION

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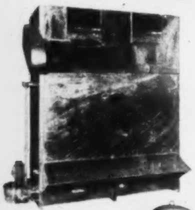
NEW YORK • CHICAGO • CLEVELAND • DETROIT • PHILADELPHIA • DALLAS • MONTREAL

ACME
PRODUCTS
★★★

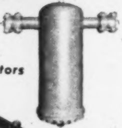
INDUCED DRAFT COOLING TOWERS

Dry-Ex Water Chillers

Freon and Ammonia Condensers



Evaporative Condensers

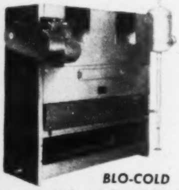


Oil Separators

Shell and Coil Condensers

Liquid Receivers

Heat Exchangers



BLO-COLD
Industrial Unit Coolers

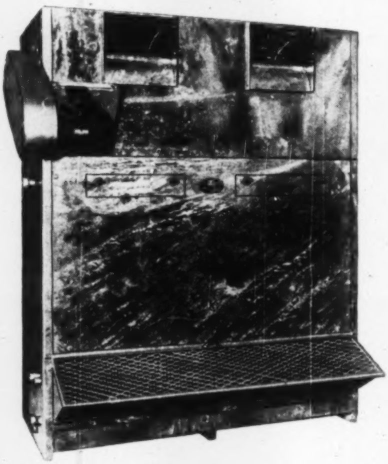
Acme

TAKES PRIDE—

—in announcing a new addition to a distinguished line of air conditioning and refrigeration products—the Induced Draft Cooling Tower.

Carefully designed and engineered to meet the high standards of Acme products—yet moderately priced through skillful manufacturing methods, Acme Induced Draft Cooling Towers are now available in sizes and capacities from 3 to 40 tons. You'll find many improvements and refinements over ordinary cooling towers. For example, the cooling pads are made of a new non-metallic material and ***will not corrode.*** Pads will hold water in suspension and give an extensive wetting surface with a minimum of bulk. Towers are easily accessible and serviced. Like the Acme Evaporative Condenser, all metal parts are ***hot-dip galvanized after fabrication.***

But you'll want to have all the details. New catalog No. 40 is just off the presses. Write for yours today.



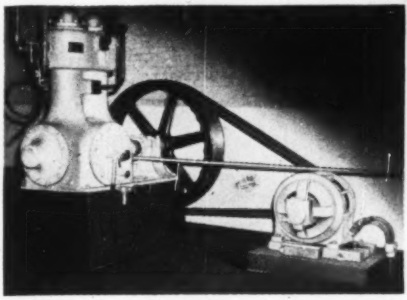
ACME INDUSTRIES INC.

Jackson, Michigan

Representatives in principal cities

Serving the refrigeration industry since 1919

A COG-BELT* IS A 40% better V-BELT



How good can a Cog-Belt get?

An ice cream manufacturer recently phoned his local Dayton Distributor about replacement of one Dayton Cog-Belt on a multiple ammonia compressor drive. Maintenance records showed that all the Dayton Cog-Belts had been on since 1930—nineteen years before the first replacement.

Dayton Cog-Belts
deliver 40% more H. P. per belt, save space, cut costs

Dayton Cog-Belts operate on ordinary pulleys on any V-Belt drive, yet transmit 40% more horsepower per belt. Why?

Cog-Belts are the only V-Belts scientifically "built to bend". As the belt goes round the pulley, preformed cogs close up (like the joints of your finger) to take up compression. Strain and distortion are eliminated, flexing heat minimized, no inching or bumping around the pulley. 40% more efficient, Dayton Cog-Belts allow use of 25% narrower pulleys, equivalently shorter centers, smaller total drive area.

If you are having belt troubles—want to save drive space, simplify maintenance, convert easily from flat to V-flat—or, if you just want a better V-Belt, call your Dayton Distributor.

*T. M.

V-Belts by

Dayton Rubber

The mark of technical excellence in natural and synthetic rubber

Advertising Copy Policy . . .

HEATING, PIPING & AIR CONDITIONING is a member of ABP and subscribes to its Standards of Practice:

> "To refuse to run any advertising copy in which any statement or representation is made which disparages or attacks the goods, prices, services or advertising of any competitor or of any other industry, or which contains statements or claims about an advertiser's own products or services which the publisher knows or has reason to believe are untrue or inaccurate."

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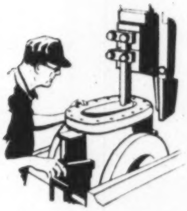
1. GOOD ADVERTISING---aims to inform the consumer and help him to buy more intelligently.
2. GOOD ADVERTISING---tells the truth, avoiding misstatement of facts as well as possible deception through implication or omission. It makes no claims which cannot be met in full and without further qualification. It uses only testimonials of competent witnesses.
3. GOOD ADVERTISING---conforms to the generally accepted standards of good taste. It seeks public acceptance on the basis of the merits of the product or service advertised rather than by the disparagement of competing goods. It tries to avoid practices that are offensive or annoying.
4. GOOD ADVERTISING---recognizes both its economic responsibility to help reduce distribution costs and its social responsibility in serving the public interest.

-Advertising Federation of America-

Heating, Piping & Air Conditioning



A DISTINCTIVE FEATURE IN DISC GUIDING

Body guides are machined down to precision tolerances, assuring a perfect guide for the disc and creating a positive center line on which all subsequent machining operations are based.

BODY PRECISION MACHINED TO INSURE PERFECT FIT OF SEAT RINGS

This operation makes inserting the seat rings in a Lunkenheimer gate valve simply a matter of screwing them into position. Parts can be replaced without any machine work or special fitting.

Precision Made
LUNKENHEIMER VALVES....

assure perfect-fitting, interchangeable parts . . . longer valve life . . . easier, lower-cost maintenance!

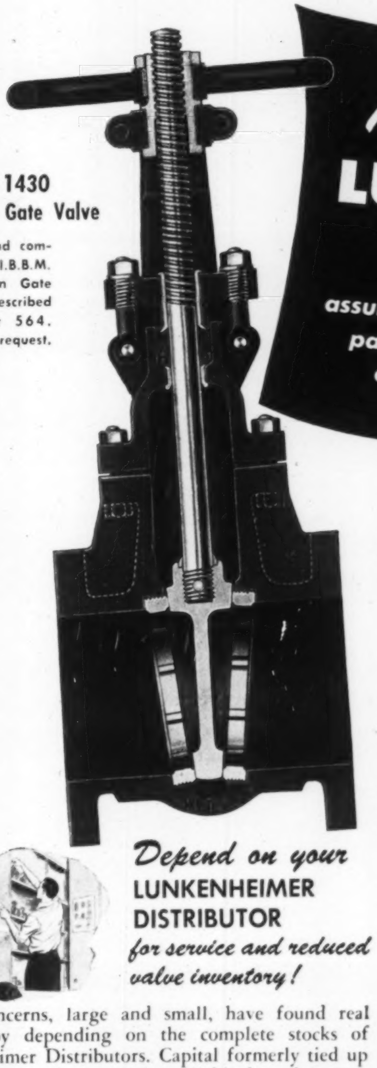
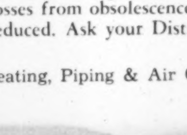


Fig. 1430
Iron Body Gate Valve

Fig. 1430 and complete line of I.B.B.M. and All Iron Gate Valves are described in Circular 564. Mailed upon request.

THE smooth working efficiency and low maintenance cost of Lunkenheimer Valves were not "made in a day." Behind this superior performance and economy lies long experience, top engineering and metallurgical facilities together with the most modern manufacturing equipment.

Lunkenheimer Valves have a streamlined simplicity of design . . . a minimum of working parts, each part of extra strength, correctly proportioned and perfectly balanced. This assures longer life with lower maintenance expense.



Depend on your
LUNKENHEIMER DISTRIBUTOR
for service and reduced valve inventory!

Many concerns, large and small, have found real savings by depending on the complete stocks of Lunkenheimer Distributors. Capital formerly tied up in slow-moving inventory is available for other uses; losses from obsolescence are eliminated or drastically reduced. Ask your Distributor how he can help you.

ESTABLISHED 1862
THE LUNKENHEIMER CO.
"QUALITY"
CINCINNATI 14, OHIO, U.S.A.
NEW YORK 13 · CHICAGO 6 · BOSTON 10 · PHILADELPHIA 34
EXPORT DEPT. CINCINNATI 14, OHIO, U.S.A.

"I can seal a pipe joint in 13 SECONDS this NEW, easy way"

"IT'S SO *EASY* to seal pipe with POLYKEN Industrial Tape No. 290! There is no paste, brush, mixing or mess, just a single material in a single size — a 1½ inch x 36 yard roll of self-sealing **Fiberglas*** tape! You strip No. 290 around the seam, cut the roll loose and the seam is sealed for good — all in less than 15 seconds! The finished job is neat, and the seal actually *improves* with age."

TAPE NO. 290 is outstanding for pipe sealing because of the two unusual materials that make it up:

1. **Fiberglas*** cloth backing—tough, super-strong, resistant to heat, corrosion and aging.
2. Flame-resistant, thermo-setting adhesive. Self-sealing on any sheet metal. *Vulcanizes* under operational temperatures.

Write Dept. D-1 today, or phone your distributor or jobber for full information on Tape No. 290 and other **Fiberglas*** tapes specially designed for heating, piping and air conditioning.

7 REASONS WHY TAPE NO. 290 SEALS PIPE BETTER

1. Speedy, safe, permanent seal
2. Sticks fast to any sheet metal
3. Absolutely non-corrosive
4. Increases structural strength of joints
5. No paste, no brush, no mixing, no mess
6. Clean, neat, permanent
7. *Actually costs less to install in many applications!*

*Fiberglas *Reg. U.S. Pat. Off by Owens-Corning Fiberglas Corp.*

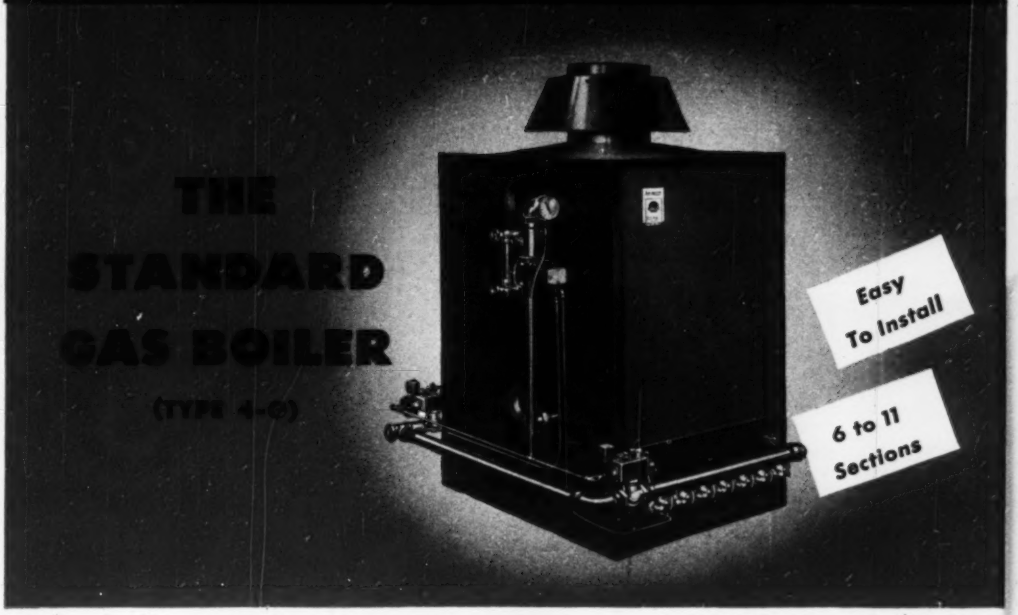
Polyken®
INDUSTRIAL TAPE

DEPARTMENT OF
BAUER & BLACK
DIVISION OF THE KENDALL COMPANY
222 W. ADAMS ST., CHICAGO 6

Production Short Cuts to Reduce Costs • Research to Speed and Improve Methods

AMERICAN-Standard

First in heating . . . first in plumbing



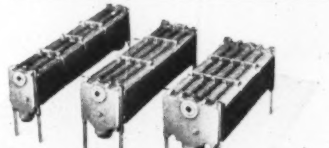
. . . *automatic gas heating* for larger homes and buildings!

Designed by gas heating experts of long experience, the STANDARD is an outstanding example of good engineering and manufacturing skill.

Heating surface, burners, controls and other essential features are coordinated to assure maximum heat output with lowest operating and maintenance cost.

Type 4-G boilers come in individual sections which may be conveniently carried through any ordinary doorway. They are easily and quickly assembled, due to accuracy of machining interchangeable parts.

Whether your need is for a single gas boiler, or for a battery of boilers, the STANDARD will give efficient, automatic gas heating in buildings of practically any type. For further information about the STANDARD, and other boilers in the American-Standard line, contact your Wholesale Distributor. **American Radiator & Standard Sanitary Corporation**, P. O. Box 1226, Pittsburgh 30, Pa.

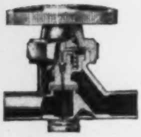


ARCO CAST IRON CONVECTORS — Scientifically engineered to provide quick, economical heating. May be installed recessed, semi-recessed, or free-standing with attractive American Enclosures.

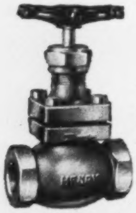
Look for this *Mark of Merit*

Serving home and industry

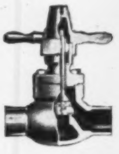
AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILER • ROSS HEATER • TONAWANDA IRON



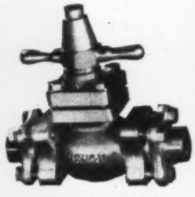
PACKLESS VALVE
With balanced-action



AMMONIA VALVE
Bolted Bonnet — screw or flanged connections. Also with screwed bonnet, sizes 1" and under



WING CAP VALVE
Non-ferrous



WING CAP VALVE
Semi-steel—with adapters

HENRY VALVE CO.
CONTROLLING FLOW
SINCE 1914

you pay—

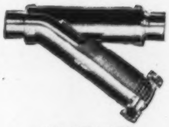
no premium for..

the extra advantages found in

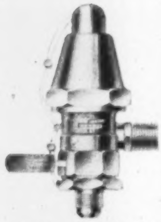
Henry products

or for the extra satisfaction that follows their use

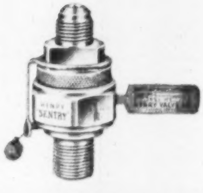
STRAINER
Angle type with patented distortion-proof flange



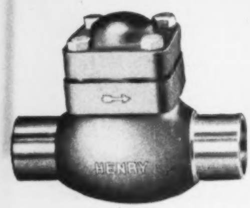
"Y" STRAINER
Welded steel with solder or F.P.T. connections



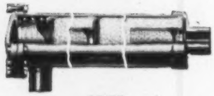
SUPER DIAPHRAGM RELIEF VALVE
With Built-in Replaceable Rupture Disc Cartridge in Outlet Port



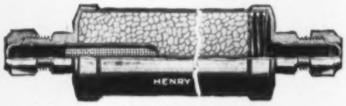
OVER-PRESSURE UNLOADER
With Replaceable Rupture Disc Cartridge



CHECK VALVE
Piston Type For Freon

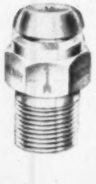


DRIER
Cartridge type with dispersion tube

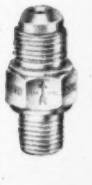


DRIER
Brass shell with dispersion tube and compression spring

OVER-PRESSURE UNLOADERS, RUPTURE PLUG TYPE



A RUPTURE PLUG
Venting To Room Atmosphere "Throw-Away" Type



A RUPTURE PLUG
With Flare Outlet Connection For Venting To Outside Atmosphere. "Throw-Away" Type

. . . Write for these catalogs

No. 99 Packless and packed valves, strainers, driers Ammonia valves, check valves, relief valves, three-way valves, scale traps, liquid gauge sets, flange unions, nut unions and accessories for air conditioning and refrigeration and industrial uses.

No. 70 Drop forged and cold rolled steel fittings.

Stocked and Sold by Leading Jobbers

VALVES • DRIERS • STRAINERS • CONTROL DEVICES and ACCESSORIES FOR REFRIGERATION and AIR CONDITIONING and INDUSTRIAL APPLICATIONS

HENRY VALVE COMPANY

MELROSE PARK, ILLINOIS (Chicago Suburb • Cable: HEVALCO, MELROSE PARK, ILLINOIS

PAYROLL SAVINGS MAGIC
SECURITY
O. SOGLOW

You already know how U. S. Savings Bonds are building future security for each Bond holder. You know that at maturity each Bond will return $4 for every $3 he invests.

But have you realized how much you can help to assure the future security of your company by vigorously promoting your Payroll Savings Plan?

IT WORKS TWO WAYS

First—by boosting employee-participation in the Plan, you increase the security, stability, and effectiveness of your personnel group. More than 20,000 companies with Payroll Savings know that corporate success is tied directly to the security of its individual employees. Your workers who invest in Bonds as a hedge against their own personal financial contingencies will enjoy greater peace of mind—will be more contented, more careful, and more productive on the job. Your company will benefit from the resulting decrease in absenteeism, labor turnover, and accidents.

Secondly—you help to strengthen the national economy from which your company must continue to draw its profits. Bond dollars represent a tremendous backlog of deferred purchasing power—dollars that will buy your products in the years to come! Furthermore, Savings Bond sales spread our national debt.

FIVE STEPS THAT BUILD SECURITY

1. See that a top management man sponsors the Plan.

2. Secure the help of the employee organizations in promoting it.

3. Adequately use posters and leaflets and run stories and editorials in company publications to inform employees of the Plan's benefits to them.

4. Make a person-to-person canvass once a year, to sign up participants.

These first four steps should win you 40-60% participation. Normal employee turnover necessitates one more step:

5. Urge each new employee, at the time he is hired, to sign up.

The experience of companies throughout the nation indicates that at least half of your employees can be persuaded to join—without high-pressure selling. All the help you need is available from your State Director, U. S. Treasury Department, Savings Bonds Division. He is listed in your phone book.

The Treasury Department acknowledges with appreciation the publication of this message by

HEATING PIPING & AIR CONDITIONING

This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and The Advertising Council.

JENKINS PRACTICAL PIPING LAYOUTS 46

How to plan a
CLOSED FEEDWATER HEATER SYSTEM

The principal application of Closed Feedwater Heaters is in regenerative stage heating of boiler feedwater in steam power plants. They are also used widely in industrial buildings, schools, hotels, hospitals and other institutions to heat the service water.

When used to raise the temperature of boiler feedwater with exhaust steam, bleed steam or live steam as the heating medium, the Feedwater Heater is usually the closed type (as in layout).

Some of the steam passing through a power plant turbine is withdrawn at various stages and goes into its own Feedwater Heater. Here it gives up its latent heat, condenses and passes into a deaerator. From the deaerator, which is at atmospheric pressure, feedwater goes to the boiler feed pumps where the pressure is raised to that of the boiler. It then passes, at about 210°F., through a Closed Feedwater Heater (like the one shown) to be heated to the highest practicable temperature.

Consultation with accredited piping engineers and contractors is recommended when planning any major piping installation.

A CHOICE OF OVER 500 VALVES

To save time, to simplify planning, to get all the advantages of Jenkins specialized valve engineering, select all the valves you need from the Jenkins Catalog. It's your best assurance of *lowest cost in the long run*.

Jenkins Bros., 80 White Street, New York 13; Bridgeport, Conn.; Boston; Philadelphia; Chicago; San Francisco; Atlanta. Jenkins Bros., Ltd., Montreal.

NEW BOOK OF PIPING LAYOUTS, Nos. 26 to 50
A new book of Jenkins Practical Piping Layouts — Nos. 26 to 50 — including above, is in preparation. Mail coupon to get your copy when ready.

JENKINS BROS., 80 White St., New York 13, N. Y.
Reserve copy of New Piping Layout Book for

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Company ....

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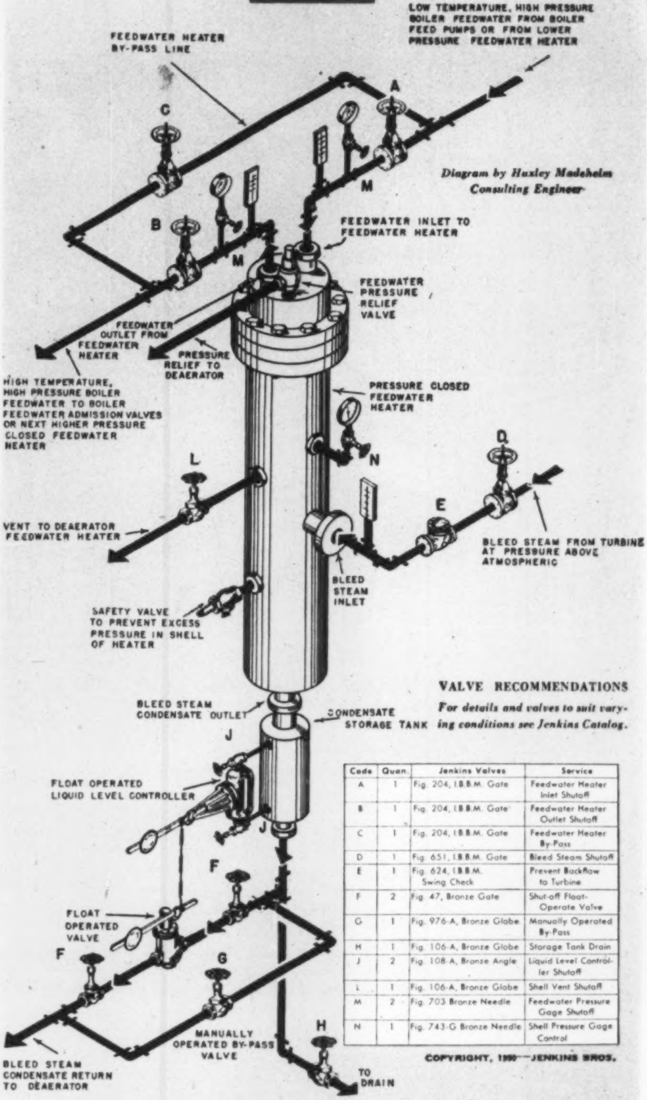
LOW TEMPERATURE, HIGH PRESSURE BOILER FEEDWATER FROM BOILER FEED PUMPS OR FROM LOWER PRESSURE FEEDWATER HEATER
FEEDWATER HEATER BY-PASS LINE
A
C
M
B
M
FEEDWATER INLET TO FEEDWATER HEATER
FEEDWATER PRESSURE RELIEF VALVE
FEEDWATER OUTLET FROM FEEDWATER HEATER
PRESSURE RELIEF TO DEAERATOR
HIGH TEMPERATURE, HIGH PRESSURE BOILER FEEDWATER TO BOILER FEEDWATER ADMISSION VALVES OR NEXT HIGHER PRESSURE CLOSED FEEDWATER HEATER
PRESSURE CLOSED FEEDWATER HEATER
N
D
L
E
VENT TO DEAERATOR FEEDWATER HEATER
BLEED STEAM FROM TURBINE AT PRESSURE ABOVE ATMOSPHERIC
BLEED STEAM INLET
SAFETY VALVE TO PREVENT EXCESS PRESSURE IN SHELL OF HEATER
BLEED STEAM CONDENSATE OUTLET
CONDENSATE STORAGE TANK
J
FLOAT OPERATED LIQUID LEVEL CONTROLLER
J
F
FLOAT OPERATED VALVE
F
G
MANUALLY OPERATED BY-PASS VALVE
H
BLEED STEAM CONDENSATE RETURN TO DEAERATOR
TO DRAIN

Diagram by Huxley Madeheim
Consulting Engineer

VALVE RECOMMENDATIONS

For details and valves to suit varying conditions see Jenkins Catalog.

Code	Quan.	Jenkins Valves	Service
A	1	Fig. 204, I.B.B.M. Gate	Feedwater Heater Inlet Shutoff
B	1	Fig. 204, I.B.B.M. Gate	Feedwater Heater Outlet Shutoff
C	1	Fig. 204, I.B.B.M. Gate	Feedwater Heater By-Pass
D	1	Fig. 651, I.B.B.M. Gate	Bleed Steam Shutoff
E	1	Fig. 624, I.B.B.M. Swing Check	Prevent Backflow to Turbine
F	2	Fig. 47, Bronze Gate	Shut-off Float-Operate Valve
G	1	Fig. 976-A, Bronze Globe	Manually Operated By-Pass
H	1	Fig. 106-A, Bronze Globe	Storage Tank Drain
J	2	Fig. 108-A, Bronze Angle	Liquid Level Controller Shutoff
L	1	Fig. 106-A, Bronze Globe	Shell Vent Shutoff
M	2	Fig. 703 Bronze Needle	Feedwater Pressure Gage Shutoff
N	1	Fig. 743-G Bronze Needle	Shell Pressure Gage Control

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JENKINS
LOOK FOR THE DIAMOND MARK
VALVES
SINCE 1864

Jenkins Bros

EQUIPMENT DEVELOPMENTS

For your convenience in obtaining more information about any of the following equipment, see coupon on this page.

HPAC 4239—BLADELESS TRASH PUMP—A new pumping unit for handling trash and sewage is being produced by Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5.

The unit is said to be different from others in that the impeller has no vanes or blades. Instead the fluid passes through the impeller through a single rotating channel or passage way with the centrifugal force doing the work. Wound somewhat like a corkscrew, this curved channel starts at a small radius at the axis of rotation and then fans outward in a helical path so that centrifugal action throws the fluid against the sides of the bent channel or passageway and, because these slant forward, the fluid carrying the solids and trash is driven along the channel. The diameter of the rotating channel at its narrowest point is equal to the diameter of the inlet pipe.

Advantages of the new pump are many, according to the company. It is said to handle unusually large trash, particularly of the fibrous type. In recent tests about 100 tennis balls passed through the pump. Handkerchief-size canvas squares, diapers, pieces of canvas up to 6 ft long and 3 ft wide emerged from the new 4 in. unit without difficulty.

The manufacturer claims outstanding advantages which include reduced attention in maintenance because of the ability to handle trashy materials of all kinds and the use of relatively small driving motors. The pump is made in sizes from 2 to 5 in.

HPAC 4240—INDUSTRIAL GAS BURNER — Rapid changeover from gas to oil firing is possible with a new RG series industrial gas burner being produced by Iron Fireman Mfg. Co., 3170 W. 106th St., Cleveland 11. It may also be changed to stoker firing.

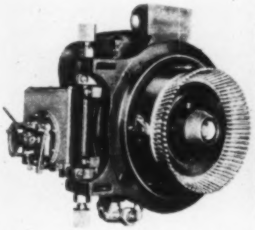
The furnace mounting plate on the burner (designed for natural or mixed gas) is provided with lugs to which the company's type R oil burner can be mounted, if desired. An adapter can also be provided for mounting a boiler front sleeve for the firm's pneumatic spreader stoker. This arrangement is designed to make possible a combination gas and oil burner, a gas and spreader stoker combination, or for many applications, a gas burner and underfeed stoker combination.

The gas burner is said to operate equally well with either natural or forced draft. When installed for natural draft conditions the refractory ring is installed so that the gas burner will induce most of the air required for combustion; however, when the burner is installed in combination with the spreader stoker, forced air is used and is provided by the undergrate fan.

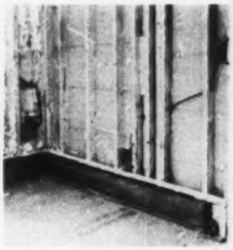
When the gas burner is used in combination with the oil burner and it is desired to burn oil for a short period of time, the oil burner is swung into position and fired through the center opening of the gas burner. This procedure is used for daily periods of gas shortage.

During periods of season gas shortage, when it is desired to burn oil for a considerable period of time, the gas burner is removed from the firing position and a nozzle protector is substituted.

The pneumatic spreader stoker, says the company, is particularly well adapted for combination gas firing as the distributor nozzle of this unit can be readily mounted inside the gas ring. It is also possible in some instances to mount the gas burner above the underfeed stoker for combination firing.



Gas Burner



Baseboard Heating Unit

HPAC 4241—BASEBOARD HEATING UNIT—A new radiant baseboard heating unit, developed by United States Radiator Corp., 300 Buhl Bldg., Detroit 26, is designed to simplify the problem of supplying temporary heat for winter construction.

As soon as the studding is in place, a 1 in. × 10 in. board is nailed to the bottom of the studs with the top of the board 10 in. from the finished floor. The baseboard unit is mounted on the board and the permanent heating installation is completed, except for valve enclosures. A sheet of aluminum foil, furnished with the unit, is used as a backing and has a 4 in. extra width which is folded over the top to keep debris out of the unit. The edge of the mounting board serves as a plaster ground.

FOR YOUR CONVENIENCE

Heating, Piping & Air Conditioning [1-50]
6 N. Michigan Ave., Chicago 2, Ill.

Please ask the manufacturers to send me more information about the equipment mentioned under the following reference numbers in Equipment Developments and Recent Trade Literature

(Circle each HPAC number in which you are interested)

4239 4240 4241 4242 4243 4244 4245 4246 4247 4248
4249 4250 4251 4252 4253 4254 4255 4256 4257 4258
4259 4260 4261 4262 4263 4264 4265 4266 4267

7497 7498 7499 7500 7501 7502 7503 7504 7505 7506
7507 7508 7509 7510 7511 7512 7513 7514 7515 7516
7517 7518 7519 7520 7521 7522 7523 7524 7525 7526
7527 7528 7529 7530 7531 7532 7533

Name.................................... Title.............
Company ....
Address ....
City.............................. Zone..... State........

Need DRY AIR?

Get *positive* protection
with Strong's Combination
Separator and Trap!

Spray guns, air chucks, fixtures and other air-using equipment, *must* be kept free of water and oil for best results. Strong's Combination Separator and Trap will completely separate all liquids from air (or steam) and automatically discharge them.

CHECK THESE FEATURES:

★ Highest operating efficiency;
★ No cleaning required;
★ Copper-clad steel float (stainless steel at additional cost);
★ Anum-Metl seat and disc—guaranteed leakproof for one year;
★ Sizes from ½ to 1½ inches, screwed; pressures to 250 psi.

Other products in the *complete* STRONG Steam Specialties line include steam traps, strainers, separators, pressure regulators and continuous blow-down valves. For complete information, write for your copy of our new Catalog No. 68 today, or see one of our nearly 200 distributors.

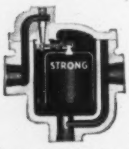
STRONG, CARLISLE & HAMMOND COMPANY
1392 West 3rd Street
Cleveland 13, Ohio

REG TRADE MARK

ANUM METL
Reg Trade Mark

OTHER STRONG STEAM SPECIALTIES

Reducing Valve

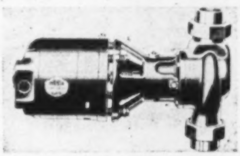


Inverted Bucket Trap

Air or Vent Trap

STRONG

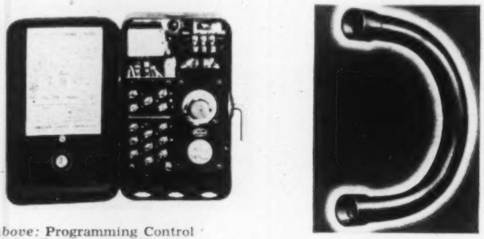
HPAC 4242—HORIZONTAL WATER CIRCULATOR—H. A. Thrush & Co., Peru, Ind., has added a new horizontal water circulator to its line of hot water heating and water supply system products.



Available in six sizes from 1 in. through 3 in., it is said to be unusually quiet because of permanent alignment provided by the special spring mounting and coupling. Features stressed by the manufacturer include sealed-in lubrication, a flexible spring coupling, a ground and polished stainless steel shaft, brass impeller and impeller plates, automatic thermal protection for all 60 cycle motors, and a large oil reservoir.

HPAC 4243—COMBUSTION PROGRAMMING CONTROL—Combustion Control Corp., 77 Broadway, Cambridge 42, Mass., has introduced "Fireye" programming control type 24PJ8. This is designed to provide automatic starting and programming of commercial and industrial oil and gas burning equipment.

Consisting of power supply, programming timer, and relays housed in a dust-tight steel case, it automatically starts the burner and programs the sequence of fuel valve opening, post ignition timing, priming, and scavenging. It is used with the company's electronic flame rod type 45JQ1 or its photoelectric scanner type 45PH5 for safeguarding gas or oil burner installations respectively against the danger of flame failure.



Above: Programming Control
Right: Radiant Heat Fitting

HPAC 4244—RADIANT HEAT FITTINGS — Capitol Mfg. & Supply Co., 153 W. Fulton St., Columbus 16, Ohio, is marketing "Redi-Bends", a new line of pipe fittings for use with wrought iron and steel radiant panel heating installations.

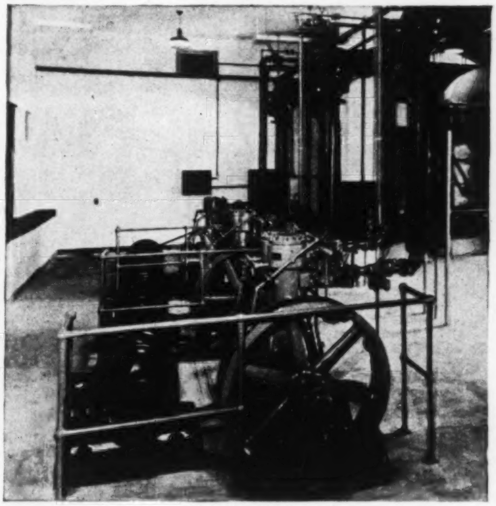
The 180 deg pipe bends are furnished in three types: with "upset" ends ready for welding; threaded and furnished with two extra heavy, recessed, taper tapped couplings; or with plain ends and supplied with two welding sleeves. The 90 and 45 deg bends are offered in the coupled type and sleeve type only. Both long and short center bends are available in the 180 deg pipe bends, and all units are furnished in steel, wrought iron, extra heavy steel, or extra heavy wrought iron.

According to the manufacturer, any radiant panel heating job can be designed to conform to the radii and centers used.

HPAC 4245—DIRECT FIRED HEATER FOR PROCESS WORK—For drying lacquers, finishes, or any material requiring temperatures up to 500 F, a new model "Thermobloc" self contained direct fired industrial heat-

HOWE REFRIGERATION KNOWN THE WORLD OVER

YOU BENEFIT – BECAUSE OF HOWE EXPERIENCE!



Three 6½ x 6½ Type D-17 Ammonia Compressors operating in Cold Storage Plant for Cuban Government

When you buy Howe, you buy *more* than a machine! Basically, Howe equipment is rugged, scientific, precision-built for sensitive temperature and humidity control. You benefit from 37 years of specialized experience. *All* factors of a Howe installation fit together to meet exacting requirements of industrial cooling and air conditioning. You are assured of correct refrigeration results at low operating and maintenance costs. Your inquiry is invited.

Ammonia compressors ½ to 150 ton; self-contained automatic ammonia units; methyl and freon condensing units; shell and tube condensers; brine and water coolers; unit coolers; fin coils; locker freezing units; air conditioning (cooling) equipment.

HOWE ICE MACHINE CO.

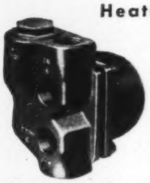
DISTRIBUTORS IN ALL PRINCIPAL CITIES

2825 Montrose Avenue, Chicago 18, Illinois

BUILDERS OF REFRIGERATION EQUIPMENT SINCE 1912

Sterlco Heating and Temperature Control Products

Heating Specialties



¾" 69-B Float and Thermostatic Trap.

Thermostatic Traps: ½" to 1" sizes; low, medium, high pressure; wide variety of body styles.

Float and Thermostatic Traps: ¾" to 2" sizes; low and high pressure.

Strainers: ⅜" to 2" sizes; cast iron or brass bodies. Also *Radiator Valves, Vents, Boiler Return Traps.*

Temperature Control Valves

120-A Thermotrol Individual Radiator Temperature Control.

No. 120 Thermotrol: Self-contained individual radiator temperature control for steam or hot water. Easily installed in place of manual radiator valve. Sizes ½" to 1"; all body styles.

Tank Temperature Controls: Self-powered modulating control valves for fluid heaters and all types of process equipment for heating or cooling. Sizes ⅜" to 2".

Condensation and Vacuum Pumps

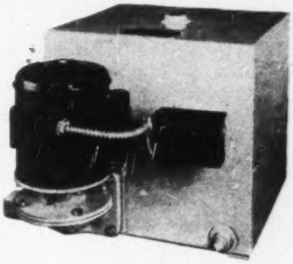
4100 Series: Compact, economical condensation pumps with 15 or 30 gallon steel tank, dual voltage capacitor type motor, rotary seal, and simple, sturdy vertical centrifugal pump. For all low pressure jobs up to 14,000 sq. ft. E.D.R. and 20 lbs. pressure.

4200 Series: Same as 4100 Series except cast iron tanks.

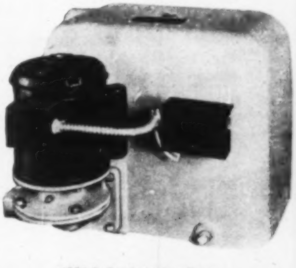
3500 Series: Heavy duty condensation pumps with pedestal mounted steel tank, for a wide range of jobs — 2000 to 65,000 sq. ft., up to 150 lbs. pressure.

3700 Series: Condensation pumps with heavy cast iron tank for installation underground or in wet locations, 2,000 to 20,000 sq. ft., 20 or 30 lbs. pressure.

Vacuum Pumps: Type V, 2500 and 5000 sq. ft., 20 lbs. pressure. Type S, 10,000 to 40,000 sq. ft., 20 to 40 lbs. pressure.



4126-B Condensation Pump (Steel Tank)



4226-B Condensation Pump (Cast Iron Tank)

Descriptive bulletins with complete specifications of any of the above products will be furnished promptly upon request.

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STERLING, INC. **3732 N. Holton Street**
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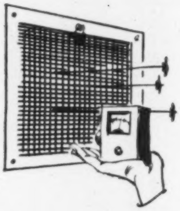
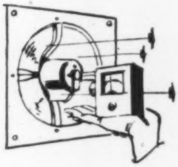
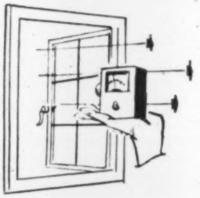
Surest way to check

Air velocities







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Handsome Genuine Leather Case
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IN NEW OR EXISTING SYSTEMS

Here's the way to take the guesswork out of the job of balancing systems and to speed up the adjustment of any air conditioning, heating, and/or ventilating set-up. It's the Alnor Velometer Jr., the miniature, direct-reading air-velocity meter—a handy low-cost instrument for instantaneous and precise measurement of air velocities in unrestricted areas. Only 4 inches high, 3 inches wide, 1½ inches deep, Velometer Jr. is precisely built for accurate performance —with double pivoted, double jeweled movement, air-actuated pointer vane, and sturdy, handsome, molded bakelite case. Available with single or double velocity range scales, Velometer Jr. can be one of your most useful tools for years to come.

ILLINOIS TESTING LABORATORIES, INC.
Chicago 10, Ill.

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PRECISION INSTRUMENTS
FOR EVERY INDUSTRY

ing unit has been developed by Prat-Daniel Corp., East Port Chester, Conn.

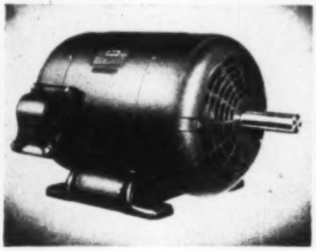
The primary unit is a gas or oil fired heater of 300,000 or 550,000 Btu per hr, employing forced air circulation. The new model is designed to recirculate its air until the desired temperature is reached and then discharge continuously at the temperature required.

It is said to be suitable for drying towers, spray booths, drying rooms, etc.

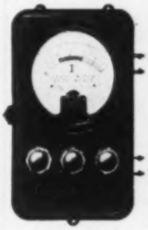
HPAC—4246—EXPLOSIONPROOF MOTOR—According to Westinghouse Electric Co., P.O. Box 868, Pittsburgh 30, heavy steel construction for resistance to corrosive atmospheres is used in the new squirrel cage, totally enclosed type CSP, explosion proof "Life-Line" motor.

Features include a special primer, thermosetting varnish, a nitrocellulose base finish, and prelubricated ball bearings. Motors are designed for constant speed drive applications, such as pumps, blowers, compressors, etc. According to the company, they may be used in any location where Class I Group D explosive materials or atmospheres are encountered.

Motors are offered in frames 224 to 326, in 1 to 20 hp ratings, for two and three phase, 25, 50, and 60 cycle, 203, 220, 440, or 550 volt service.



Explosionproof Motor



Smoke Indicator

HPAC 4247—SMOKE DENSITY INDICATOR—Excess smoke indicator type 2A10C is designed to give a continuous indication in the boiler room of the condition of gases which are passing through the flue, signalling when either smoke or air is excessive. It has been developed by Photoswitch, Inc., 77 Broadway, Cambridge 42, Mass., for commercial and industrial use.

A photoelectric control unit operates a dual relay system and indicating meter. The control and light source are mounted on opposite sides of the flue or breeching, the light beam projecting from an opening in the flue to the eye of the control. The density meter, calibrated in Ringelmann values, is located on the boiler room instrument panel.

HPAC 4248—PRESSURE GAGE PROTECTOR—The pressure gage "snubber" of Parker Appliance Co., 17325 Euclid Ave., Cleveland 12, is designed to provide protection against line shocks and vibration while eliminating needle fluctuation.

Made of forged stainless steel or brass, the device is offered with ¼ or ½ in. pipe thread connections for pressures up to 5000 psi. By the use of three snubbing pins in a side opening chamber, out of the line of flow, 13 steps of ajustment may be made.

Same
Mounting
as AC
Contactor
New DC
SOLENOID CONTACTORS
save installation time

Unit construction—
Fit standard AC mounting

Now, with this modern, compact solenoid-type contactor . . . you'll no longer have the nuisance of drilling special holes for each component and furnishing special insulation.

Ward Leonard's new Size 1, 2 and 3 DC Solenoid Contactors are *unit-insulated*—and have metal base plates which fit AC contactor dimensions.

Same accessibility of wiring as AC contactors . . . silver-to-silver contacts . . . components interchangeable with AC contactors.

Write for new Bulletin 1950. WARD LEONARD ELECTRIC CO., 24 South Street, Mount Vernon, N. Y. Offices in principal cities of U. S. and Canada.

WARD LEONARD
ELECTRIC COMPANY
Result-Engineered Controls
RESISTORS • RHEOSTATS • RELAYS • CONTROL DEVICES

ANOTHER REASON WHY
Badger
IS FIRST IN
expansion joints

PACKLESS
EXCLUSIVE
all-curve corrugations
equalize stresses
COLD
HEATED

Because the flexing member is made from a single tube, Badger Expansion Joints are installed without packings. This feature alone means valuable savings in man hours . . . assures long service without attention.

And that's only *one* reason why you get top performance — *at lowest cost* — from Badger Corrugated Expansion Joints. Here are others:

- Flexible . . . joints easily compress and expand reducing thrust on adjacent fittings and equipment
- Compact . . . require no more space than regular flanged fittings
- Special forming methods . . . no danger of structure-weakening stresses
- Controlled heat treating . . . to assure long life for flexing member
- Directed flexing rings . . . to equalize stresses *between* and *within* corrugations

These features are important in any pipe line job — you can get them *all* only by specifying Badger Expansion Joints.

Write today for Bulletin 100 (self-equalizing type) or Bulletin 200 (non-equalizing type).

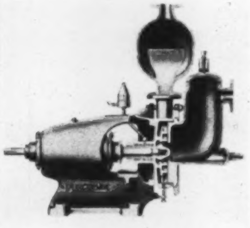
Badger
MANUFACTURING COMPANY
260 BENT ST. CAMBRIDGE 41, MASS.

HPAC 4249—CORROSION RESISTING PUMP—Now in production at the plant of Duriron Co., Inc., Dayton 1, Ohio, is the model 40 series R, self priming "Durcopump".

According to the company, plant tests conducted in accordance with Hydraulic Institute standards have shown this centrifugal pump to prime in 22 sec with a static lift of 15 ft, and after being primed, to maintain dry vacuum as high as 28.4 in Hg. With a static lift of 10 ft, says the firm, air was admitted to the suction line of a 1½ × 1½ in. unit at the rate of 54 cfm without breaking the prime.

In addition to exceptional efficiency and air handling capacity, features of the pump are said to include the conversion of wet end parts from one alloy to another without changing working dimensions or the power end, "Teflon" seal cages in stuffing boxes for lubricant or liquid seal, micro-adjustment of the impeller in the casing, and renewable shaft sleeves.

Available in 12 corrosion resisting alloys, units are offered in two sizes; one with capacity from 20 gpm at 81 ft head to 160 gpm at 33 ft, and the other having capacity of 40 gpm at 125 ft head to 240 gpm at 75 ft.


Corrosion Resistant Pump

Motor Starter

HPAC 4250—MOTOR STARTER—A new Bulletin 646 manual, autotransformer type starter for squirrel cage motors is now offered by the Allen-Bradley Co., 1335 S. First St., Milwaukee.

It is available in four sizes from 5 hp, 220-440-550 volts, to 250 hp, 440-550 volts; for 25, 50, and 60 cycles. The switch mechanism operates with a quick make, quick break action. Two automatic reset overload relays are standard equipment in all starters.

The new line comes in two forms; Form T, with air break contacts, and Form X with oil immersed contacts. The air break form can be converted to oil immersed operation by adding a standard oil tank that is supported beneath the switch. Over-all dimensions remain the same for air or oil immersed starters.

HPAC 4251—VALVE SEAT RING WRENCHES—To make valve maintenance easier, Lunkenheimer Co., Beekman & Waverly Aves., Cincinnati 14, is offering two new steel seat ring wrenches. In use, the union bonnet ring of the valve acts as a guide, bearing against a shoulder on the wrench so as to provide firm engagement with seat ring being removed or put in place.

The Fig. 1652 wrench has a threaded collar which provides for adjustment on different depth valves. It is designed primarily for use on the company's bronze "Renewo" and "Ferrenewo" plug type valves and is available in sizes to fit valves from ¼ to 3 in.

The Fig. 1656 wrench is designed for AAR plug type valves from ¼ to 2 in. and is of one piece construction.

Combines Floor Coils and Conditioned Air for Flexibility

By C. B. Rowley
C. B. Rowley & Associates, Inc., Cleveland, Ohio

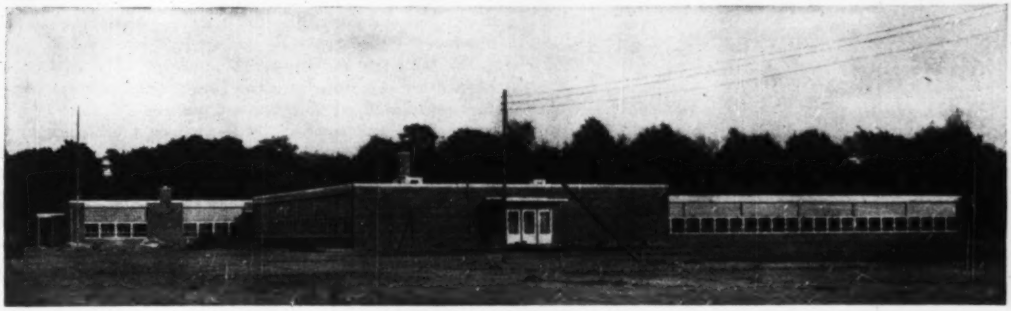


Fig. 1. Bayard Road School, South Euclid, Ohio. Architects: C. B. Rowley & Assoc., Inc.; Heating Engineers: Vincent Eaton; Heating and Ventilating Contractors: J. J. McHale Co.

WITH the trend toward single-story, basementless buildings for elementary schools, we have given considerable thought to the development of systems combining radiant heating and air heating in order to secure a highly uniform heating and flexible control. A recent installation is that of the 12-room Bayard Road School of South Euclid, Ohio, shown in Fig. 1.

The two gas-fired steam boilers shown in Fig. 2 are connected to a heat exchanger for the panels in the floors. These floor coils in each of the main 11 classrooms consist of about 500 ft. of 1″ wrought iron—all arc welded. Main steam lines are 8-inch and header is 10-inch pipe. All welding was done with Lincoln "Fleetweld 5" electrode and engine-driven "Shield-Arc" Welder.

Temperature of the floor coils is controlled by the outside temperature so that the floor slab is kept at 68°-85° and will not overshoot. The maximum temperature of the water circulating in the panels is 130°. This radiant heating takes care of the heat loss. The ventilating air is supplied as follows:

Three blower units, one in each wing, takes outside air and mixes it with return air, filters it, passes it over steam coils to bring it up to 65°-70° and discharges it into the pipe tunnel of each wing. Each room takes its air through a damper-controlled duct and a steam-heated booster coil from the tunnel. All temperatures are controlled by thermostats, properly located.

Fig. 2. Welding 8-inch steam mains.

The above is published by **THE LINCOLN ELECTRIC COMPANY** *in the interests of progress.*
Write for free Mild Steel Weldirectory. The Lincoln Electric Company, Dept. 281, Cleveland 1, Ohio.
Sales Offices and Field Service Shops in all principal cities.

A COMPLETE LINE OF...

GAS BOILERS

Type 20 Boiler — Forty-one sizes, 315,000, 3,780,000 Btu input, in Btu increments of 63,000 capacity.

Type 10 Boiler — Nine sizes, from 54,000 to 378,000 Btu input, in increments of 27,000 Btu.

Type 11 Boiler — Same as Type 10 except that controls are not enclosed in outer cabinet.

...PLUS

UNIT HEATERS

Type 150 Unit Heater — Steel. Suspended type. 60,000, 90,000, 120,000 and 150,000 Btu input.

Type "UH" Unit Heater — Space heating unit for factories, warehouses, hangers, shops. Nine sizes, 180,000-540,000 Btu input, in increments of 45,000 Btu.

GAS CONVERSION BURNER

Type 500 Conversion Burner — Four sizes, 125,000, 175,000, 225,000 and 275,000 Btu input. Easily adjusted for proper capacity.

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Here's a line engineered to give you a competitive sales advantage on any job—domestic or commercial: A complete line of gas-fired boilers — sized to give you close-to-capacity bids on any job; plus compact, efficient unit-heaters, and the outstanding gas conversion burner on the market today. All compact, efficient, handsome, easy to install — and backed by Mueller's 93-year record of leadership. Write for details. *L. J. Mueller Furnace Company, 2101 West Oklahoma Avenue, Milwaukee 15, Wisconsin.*

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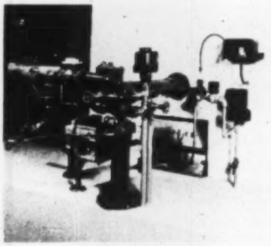
E-40

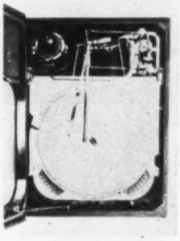
FOR GAS FOR OIL FOR COAL

For use with screw-over bonnet valves which do not have union bonnet rings, the Fig. 1653 bronze retaining ring is used to hold the wrench in place.

HPAC 4252—COMBINATION OIL-GAS BURNER— Simplex Oil Heating Corp., 11 Park Pl., New York 7, has developed a new combination oil-gas burner. Basically, the unit consists of the company's pneumatic, turbine drive type oil burner which has only one moving part, the rotary atomizing unit operating on two enclosed ball bearings. To convert to gas firing, the atomizing unit is removed and replaced by a stationary adjustable gas deflector cone. According to the company, conversion from one fuel to the other can be made in less than 5 min.

The same fan unit is used to supply primary air to the burner for both fuels and the same design of refractory furnace is used for both gas and oil. All valves and fuel connections are permanently located on the burner and do not require connecting and disconnecting when changing fuel.


Oil-Gas Burner

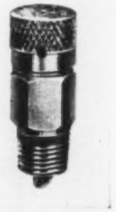

Control Instrument

HPAC 4253—AIR OPERATED CONTROL INSTRUMENTS—The line of air operated control instruments, known as the series 500 controllers, offered by Bristol Co., Waterbury, Conn., includes units for automatically controlling temperature, pressure, flow, liquid level, humidity, and pH value.

The controllers have calibrated control actions and reset rate, derivative time, and proportional band adjustments are said to be accurately calibrated and reproducible. They have only one service adjustment. Units are designed so they can be completely disassembled and after being reassembled, with replacement parts, only one adjustment is required to put the system in calibration. All instruments are equipped with reset action stops and are offered in five types of control action: on-off, proportional, reset, derivative, and reset plus derivative.

HPAC 4254—VENT VALVE FOR HOT WATER HEATING—A fast venting, expansion type air valve for hot water heating systems is available from Maid-O'-Mist, Inc., 3217 N. Pulaski Rd., Chicago 41. Known as the No. 72 "Auto-Vent", it has been designed and sized for installation on convectors, baseboard units, and free standing radiators.

All expansion and contraction of the composition disk is confined to four venting slots. This, plus its internal siphon tube, is said to make it unusually fast venting. The valve is made of nonferrous metals.



THE LOWDOWN ON INSULATION

How to lick a phantom

You can't see water vapor. But you can't ignore it, either. If vapor ever gets into your cold room insulation, it multiplies your power costs, ices up, makes walls bulge and break, leads to costly repairs.

To lick vapor, you need two things. First, an insulation material that inherently resists moisture, such as Novoid Corkboard. Second, a material on which you can apply a strong and lasting vapor seal.

To seal Novoid Corkboard, you simply dip each board in melted asphalt before putting it in place. No need for elaborate technique; nothing to puncture or tear.

Novoid Corkboard is American-made, under the strictest quality control. And it's installed by some of the most experienced, dependable men in the business. About the best way to keep refrigeration costs down, is to insulate in the first place with Novoid Corkboard and Novoid Cork Covering for pipes and fittings. If conflicting insulation claims confuse you, just write to us. We'll be glad to send you the "lowdown." Novoid Cork, Englewood, N. J.

Consider EVERY factor when you buy insulation—and you'll buy NOVOID

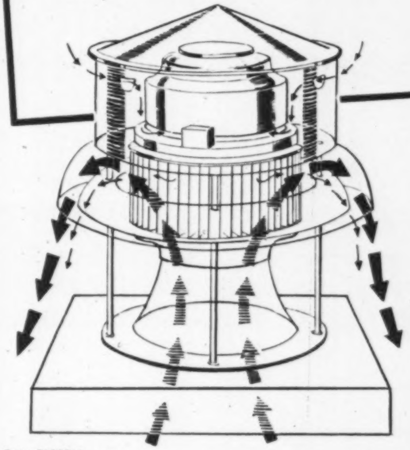
Check list of insulation properties

	Novoid Cork Insulation	Many Other Insulations
First cost	moderate	low to high
Installation cost	low	moderate to expensive
Eventual cost	low	high
Efficiency	remains high	generally deteriorates
Moisture resistance	excellent	some good, some poor
Vapor seal	simple	complicated or difficult to install
Structural strength	very good	some non-existent, others fair
Weight	very light	varies
Resilience	considerable	from fair to complete rigidity
Settling	none	a serious problem
Supporting structure	none	elaborate
Fire resistance	good	excellent to poor
Vermin resistance	good	excellent to very bad
Odor absorption	none	some are regular sponges

NEW

GALLAHER Air-Van Power Exhauster

- Motor out of the air stream
- Low Silhouette
- Positive acting squirrel-cage fan—no backdraft damper required
- Direct Connected, completely weatherproof and self contained, requires no penthouse



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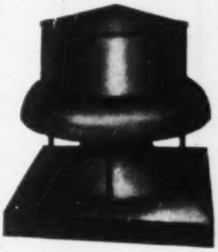
Pats Pending

DESIGNED for the TOUGH JOBS



Will handle entrained moisture and corrosive fumes without the danger of motor damage. Ideal for such applications as toilet exhausts, range hoods, chemical lab hoods, cannery processing rooms, etc. Fresh air through hood under negative pressure prevents formation of explosive concentrations.

Capacities 100-12,000 CFM, static pressures to 1¾". Certified ratings.

Available in special metals for unusual applications. Heaviest construction of any device of its kind. Motors have grease-sealed lifetime bearings for reduced servicing .

For Full information, contact your Gallaher representative or write The Gallaher Co., 4106 Dodge St., Omaha 3, Nebraska

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TIME, WORK AND CASH

"The tougher the job, the tougher the tools have gotta be—for me that's RIDGIDs."
If this Housing ever Breaks or Distorts we will replace it Free
TRADE RIDGID MARK PAT.

RIDGID's guarantee means no pipe wrench housing expense—at all, ever

● Workers everywhere like the work-saver features that make RIDGID the world's favorite. Housing is guaranteed against breakage or distortion. Adjusting nut spins easily in all sizes 6" to 60." Handy pipe scale on hookjaw. Instant-action non-slip, non-lock jaws. Powerful comfort-grip I-beam handle with flared end that won't let your hand slip off. RIDGIDs save your time and money. Buy them at your Supply House.

RIDGID
WORK-SAVER PIPE TOOLS
THE RIDGE TOOL CO. • ELYRIA, OHIO

HPAC 4255—VACUUM GAGE—A new vacuum gage for measurements in the range of 1 to 1000 microns has been developed by Hastings Instrument Co., Hampton, Va. Embodying a noble metal thermopile and a bridge circuit similar to those used in the company's air meter, it includes an electrical indicator and a small pickup which screws into a ⅛ in. tapped hole in the vacuum system.

Fast response, interchangeability of pickups without recalibration, freedom from outgassing and corrosion, and freedom from damage by exposure to atmospheric pressure are said to be outstanding features. The manufacturer states that calibration is not affected by the length of connecting cable, thus allowing remote indication and recording. The unit operates on 115 volts, a-c.

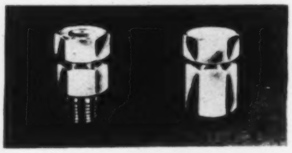
Vacuum Gage

Vent Valve, Flame Arrestor

HPAC 4256—VENT VALVE AND FLAME ARRESTOR—Black, Sivalls & Bryson, Inc., 720 Delaware, Kansas City 6, Mo., has combined its VVH pressure-vacuum vent valve with a flame arrestor bank designed to prevent propagation of flame into a storage tank containing a volatile liquid.

The arrestor bank fits into the throat of the valve and becomes an integral part of the valve body. The bank, of rolled aluminum construction, can be removed for cleaning or replacement by releasing the retaining ring spring.

Rubber-to-metal sealing is used to make the valve tight and to prevent it from freezing shut. The unit is said to offer a minimum resistance to vapor flow and has been approved by the Underwriters' Laboratories.



HPAC 4257—SPRAY NOZZLES—The new line of spray nozzles of Binks Mfg. Co., 3122 Carroll Ave., Chicago 12, has been designed to provide flexibility, low maintenance costs, and improved atomization.

The No. 12 series nozzles provide a round spray pattern and are recommended for a wide range of applications requiring diffusion of a liquid, such as water, oil, solvents, and fluids of similar viscosity. No. 14 series nozzles are similar to the No. 12 except they give a flat spray pattern. Orifice tips, strainers, and all other parts of the Nos. 12 and 14 series are interchangeable between male and female bodies of the same size.

The No. 16 series units are large capacity nozzles rated in gallons per minute. No. 17 series "Deflectojet" nozzles are of the impact type and deliver a flat spray pattern. Shown here are No. 12 series nozzles.

New Bond Store Air Conditioned throughout with

Frick Refrigeration

This Bond Clothing Store at Reading, Penna., is the newest in a chain of 68. Remarkable for its super-modern design and appointments, the store is kept cool in hot weather with three Frick NEW "ECLIPSE" refrigerating machines.

Whether you need an air conditioning, refrigerating or ice making system, you can buy it in any commercial or industrial size from

The Whole Building is Air Conditioned

DEPENDABLE REFRIGERATION SINCE 1882
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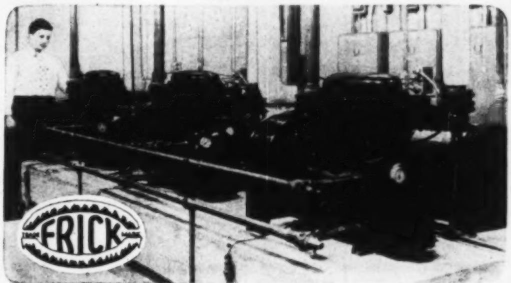
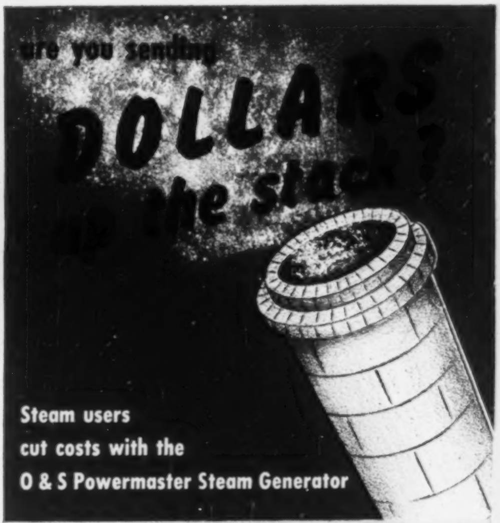
WAYNESBORO, PENNA. U.S.A.

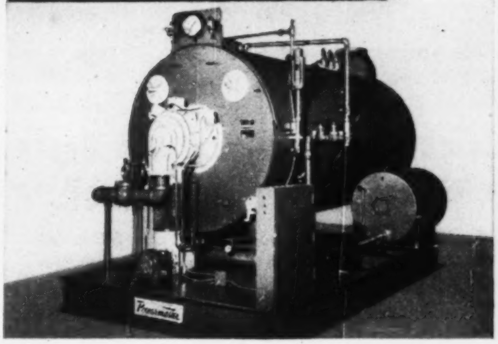
Also Builders of Power Farming and Sawmill Machinery

NEW "ECLIPSE" Compressors at Bond Clothing Store, Reading, Penna.





Steam users
cut costs with the
O & S Powermaster Steam Generator



FUEL COSTS REDUCED as much as 40% through high efficiency maintained regardless of fluctuating loads.

OPERATING COSTS REDUCED — fully automatic unit cuts labor and maintenance time to minimum.

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D.I.P. ENGINEERED for Positive Protection
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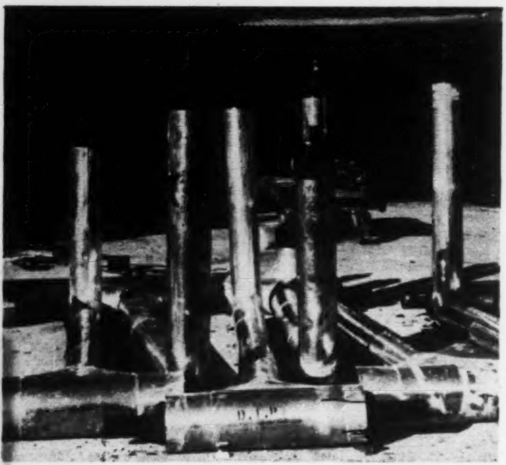

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- DURANT Pre-Sealed INSULATED PIPE is the ORIGINAL positive protection to maintain low heat loss in the conveyance of steam, hot water, or refrigerants in underground or exposed piping. It is completely waterproof and eliminates corrosion and electrolysis.

Many leading architects and engineers specify D. I. P. wherever long term dependable service is required. Both installation and maintenance costs are kept at a minimum. No tile or masonry protection is required and field joint work is a simple four step process.

Our representatives, conveniently located in principal cities, are at your service. Or we will be glad to provide catalog and engineering data on request.

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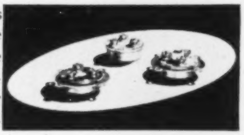
DURANT INSULATED PIPE COMPANY
1015 Runnymede St. East Palo Alto, California

HPAC 4258—CONTROL VALVE—The "Stabilflo" air operated control valve of Foxboro Co., Foxboro, Mass., features quick reversibility of action. According to the company, the valve may be changed from "air to open" to "air to close" in a few minutes and without the use of special tools. It is not necessary to remove the valve or to shut down the flow. To reverse the action of the valve motor, the housing assembly is removed, rotated one quarter turn, and replaced.

The ease of reversibility is said to be of special value especially where changes must be made in existing installations, to provide convenience in test work or pilot plant operation, and to simplify and reduce stocks of spare valves.

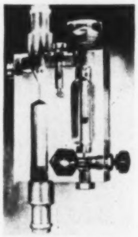
HPAC 4259—SNAP ACTION THERMOSTATS—The type C4370 fixed temperature, snap action "Klixon" thermostats of Spencer Thermostat Div., Metals and Controls Corp., Attleboro, Mass., are designed for such use as the control of unit and space heaters, water heaters, and other products requiring nonadjustable temperature control.



The snap acting disc and contacts are enclosed for protection against dust, dirt, etc. The entire unit can be mounted in recessed wells, in castings, on flat surfaces, or in sheet metal enclosures. The thermostat is offered with various temperature differentials in settings from —10 to 550 F and in either manual reset or automatic reset types.

HPAC 4260—CHEMICAL FEEDER—Measuring about 5 in. × 10 in. × 2 in. overall, the "Feed-Rator" is a self contained chemical feeder developed by Fischer & Porter Co., Hatboro, Pa.

It is said to simultaneously control, meter, and dispense relatively small amounts of bactericides, catalysts, disinfectants, fungicides, inhibitors, reagents, and other chemicals into a larger stream. Of transparent acrylic plastic and utilizing an eductor, the device is designed to handle corrosive chemicals directly from a container.



It may be used to treat up to 7000 gal per day of water directly. In a bypass arrangement and using a solution containing 5 percent active reagent by weight, five parts per million of the reagent can be delivered to over 14 million gal of water per day.

HPAC 4261—LIQUID SHOCK ABSORBER—The "Heyden" liquid shock absorber of R-S Products Corp., 4530 Germantown Ave., Philadelphia 44, is designed to eliminate hydraulic shock and hammering in pipe lines carrying water or petroleum products.

Having no moving parts, it absorbs shock by means of a rubber cushion encased in a spherical chamber. The cushion, says the company, "pulsates constantly according to the needs of the system as may be reflected by an increase or decrease of pressure in the system."

Made of corrosion resistant metals, the device is offered

If you pipe it...there's a Fairbanks valve to control it

Here are two typical examples of the outstanding design, sound engineering and rugged construction that are built into every Fairbanks Valve. Years of experience in meeting all kinds of valve requirements for industry, have given Fairbanks Engineers a storehouse of knowledge in controlling the flow of water, steam, gas, oil, chemicals, etc. Consult them without obligation.

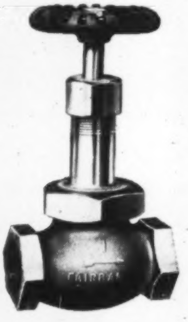


Fig. U-01
Renewable Composition Disc Globe Valve — 150 lb. S.W.P.

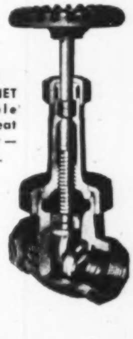


Fig. 0236
UNION BONNET — Renewable Nickel Alloy Seat Gate Valve — 200 lb. S.W.P.

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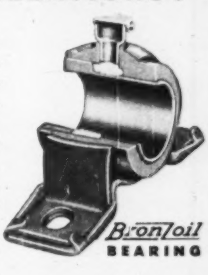

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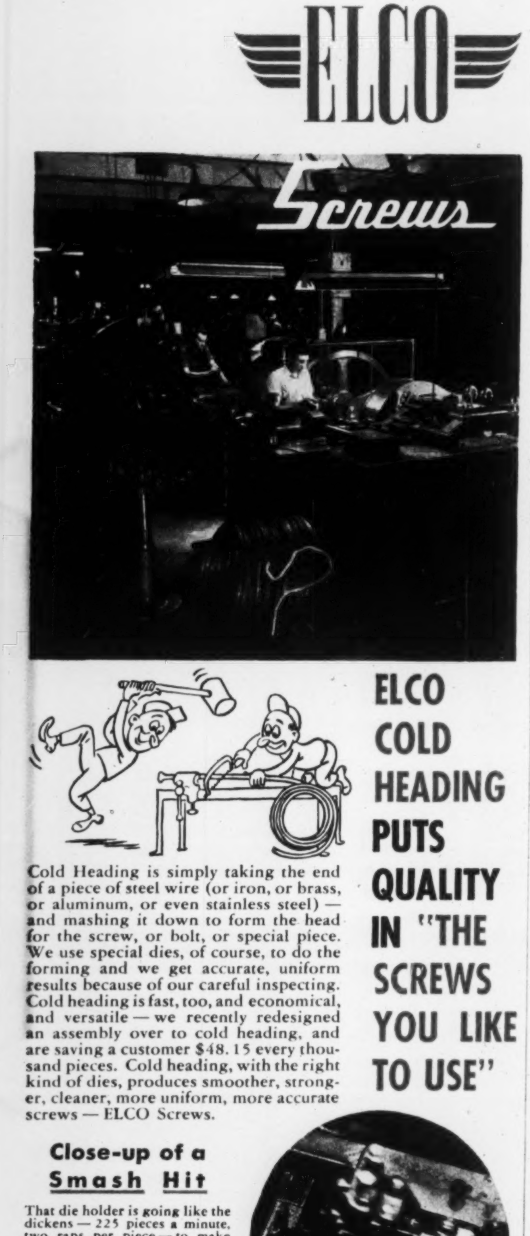

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That die holder is going like the dickens — 225 pieces a minute, two raps per piece — to make heads on 8-32x¾" round head machine screws.

ELCO TOOL & SCREW CORP.
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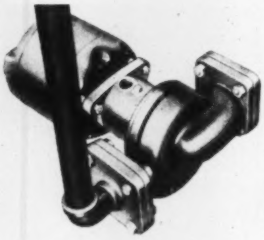
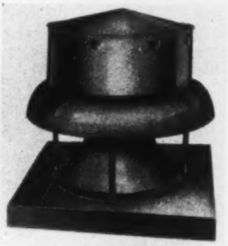
in four models and may be installed in any position. It is said to be suitable for any size system.

HPAC 4262—HOT WATER CIRCULATING PUMP—A new hot water circulating pump available in sizes from 1 in. through 2½ in. has been developed by Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5.

The pump, according to the manufacturer, will warm remote rooms rapidly, reduce fuel consumption, and help reduce calcification in the pipe lines. It utilizes a heavy duty type mechanical seal designed to assure positive protection against leakage, is said to be unusually smooth and quiet in operation, by virtue of a molded rubber shaft coupling, and to be especially adapted for panel and radiant heating and circulating hot water in large buildings. It can be installed in either the vertical or horizontal position.



Circulating Pump



Air Exhauster

HPAC 4263—POWER EXHAUSTER—Now in production at the plant of Gallaher Co., 4106 Dodge St., Omaha 3, Neb., is the "Air-Van" power air exhausting unit.

With capacities from 150 to 12,000 cfm, it is of low silhouette design and features an enclosed motor located out of the air stream for protection against explosive dangers and corrosive action by moisture or chemical fumes. The motor is of the pancake type with grease sealed bearings. A squirrel cage fan is used and the air outlet is designed to prevent "blow back" under adverse weather conditions. The unit can be furnished in special metals and is said to be completely weatherproof.

HPAC 4264—SUSPENDED AIR HEATER—A new suspended, oil fired air heater, the "Superfex" model 540, is available from Perfection Stove Co., 7609 Platt Ave., Cleveland 4.

Recommended for use in heating garages, service stations, stores, churches, schools, small factories, warehouses, etc., it has a rated output of 125,000 to 150,000 Btu per hr. The cylindrical combustion chamber is made of chrome steel and rests on a stainless steel cradle, so it is free to expand and contract in every direction.

The axial flow, direct drive, two speed fan is rated to deliver 1800 to 2000 cfm. The fan blades are adjustable and the unit is fully automatic. Air flow is established at low blower speed within 2 to 3 min after the thermostat calls for heat. As the bonnet temperature increases, the blower automatically steps up to high speed.

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In short, Klipfel engineers have prepared these bulletins to assist you in selecting the type and size valve best suited to your needs.

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for steam, air and water . . . in lever and weight, air loaded, pilot control and spring loaded types; descriptions, illustrations and complete selection data in Bulltin 148.

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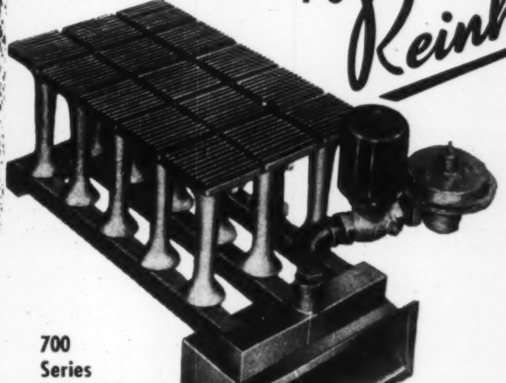

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Write Dept. L

GOVERNAIR CORPORATION
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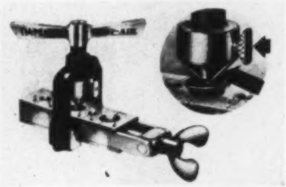
HPAC 4265—FLARING TOOL—Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago 7, has developed a new No. 355-F "Rol-Air" flaring tool which both flares and burnishes tubing in sizes ¼, 5/16, ⅜, ½, and ⅝ in. O.D.



The tool has three rollers embodied in a spreader cone, and the flare is rolled with the tubing extended above the face of the flaring block. The original wall thickness, says the company, is maintained because the base of the flare is not formed against the die. After flaring, the tubing is burnished by turning the handle of the tool two or more revolutions with the control knob in burnishing position.

HPAC 4266—RADIATOR ENCLOSURES—The radiator enclosures of Acme Mfg. Co., State Rd. below Rhawn St., Philadelphia 36, are shipped knocked down.

The interlocking design is said to assure tight and sturdy assembly in a matter of seconds without the use of tools or hardware. Offered in white or ivory baked enamel finish, units are available in five standard sizes. Special sizes are made to order and humidifier pans are optional.

HPAC 4267—ARC WELDER—A small low cost arc welder, operating off a 110 volt lighting circuit, yet said to have design and operating characteristics comparable to larger industrial welders, has been developed by Lincoln Electric Co., Cleveland.

With a maximum output of 60 amp, the "Lincwelder 60" is recommended for a variety of light gage metal working jobs, as well as for joining heavier material such as strap, pipe tubing, angle, and other shapes. The unit may also be used for cutting metals, soldering and making wire connections, brazing, heating for bending and, with a small rectifier, for battery charging.

Equipment Shorts

The thermometer business of **American Thermometer Co.**, St. Louis, has been purchased by **H-B Instrument Co.**, Philadelphia. All facilities have been transferred to Philadelphia, and products acquired include thermometers for use in connection with refrigerators, brine, and air ducts. .... Over 100 men comprising the industrial insulation field sales organization of **Armstrong Cork Co.**, Lancaster, Pa., recently attended the first general meeting of the group since the war. Sessions were designed to bring the men up to date on company objectives. Several projected developments in both the high and low temperature insulation fields were outlined.

Products of the recently acquired **Belfield Valve Division** of **Minneapolis-Honeywell Regulator Co.**, are now being sold through 74 Honeywell branch offices in the United States, Canada, and Europe. The move is part of an

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Easier to
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Easier to
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Here are compact, complete, *packaged* boiler-burner units in sizes for home and industry, for low-pressure steam and hot water heating and/or hot water supply.

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All Aldrich boilers are available for either oil or gas firing with burners readily interchangeable.

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This outstanding boiler-burner unit, designed especially for the modern 4 to 5 room home, stands only 45" high, occupies 20" x 33" of floor space. Rated at 100,000 BTU, it can be adapted to steam, hot water, or radiant heating systems, and provides domestic hot water in excess of FHA requirements. Models also available for hot water supply only

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Skillfully engineered, precision-built for economy and trouble-free service. No radio interference from motors and transformers. Burners flange or base mounted. Model CX: .75 to 2 GPH. Model SAX (shown) with interchangeable draft tubes and air cones: .75 to 4.50 GPH. Model BX: 4 to 8.50 GPH. Model JU Heavy Duty: 7 to 19 GPH.

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Choose a Governair Evaporative Condenser, and *forget* those water problems!

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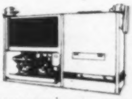
AIR CONDITIONER



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intensive overall selling program. . . . . During the recent annual sales conference of **Lau Blower Co.**, Dayton, Ohio, over 35 representatives and their salesmen were initiated into "Betta-Sella-Fan" fraternity.

The largest liner ever to be constructed in the United States will be completely air conditioned, utilizing a turbo compressor water cooling system of **York Corp.**, York, Pa. The vessel, being built for the United States Lines by Newport News Shipbuilding and Dry Dock Co., will require the largest air conditioning system ever installed on shipboard. . . . . Twenty-two graduate engineers, all with war service records, recently completed a four week sales training course at the headquarters plant of the lamp division, **Westinghouse Electric Corp.**, Bloomfield, N. J.

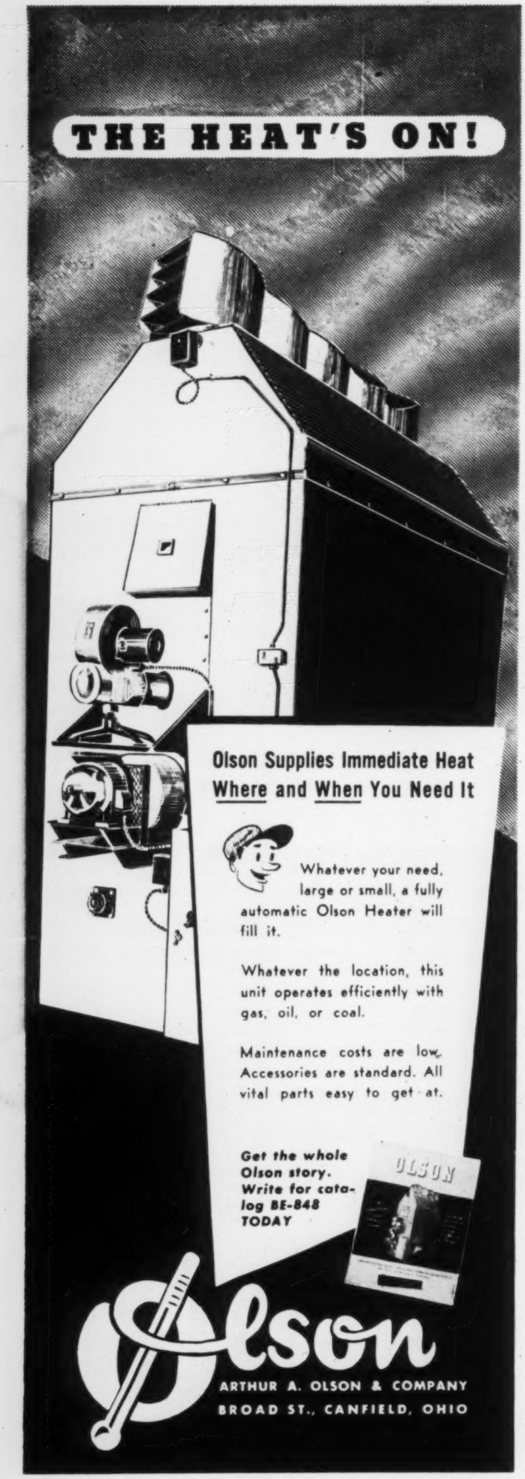
Nelson Stud Welding Div., Morton Gregory Corp., Lorain, Ohio, has prepared an 18 min color sound movie on methods and advantages of stud welding. Applications covered include steel roof decks, piping, electrical equipment, and various building materials. Architectural, engineering, and contractors' organizations and other interested groups can arrange for bookings through the company.

Balfour Guthrie & Co., Ltd., distributor of industrial products on the Pacific coast, has been named distributor for "Borgana" the newest product of **Portland Shingle Co.**, Portland, Ore. The product is a boiler treatment for the prevention of scale and corrosion. It is said to be harmless and odorless and will be distributed in all western states, Alaska, British Columbia, and Hawaii through Balfour Guthrie branch offices in Portland, Seattle, Tacoma, Spokane, Los Angeles, and San Francisco.

Transformers for use as a source of high voltage in equipment for electrostatic precipitation of smoke, metals, or other materials from gaseous mixtures are available from **Westinghouse Electric Corp.**, P. O. Box 868, Pittsburgh 30. Units are oil insulated and hermetically sealed, and all major gaskets are eliminated by welding or soldering. Radio interference and corona are said to be kept to low levels. Transformers are available in 5, 7½, 10, 15, and 25 kva sizes for 60,000 or 75,000 volt operation at 60 cycles.

A new package for glass thermometers, designed to reduce breakage, simplify inspection and testing, and speed identification of contents, has been introduced by **C. J. Tagliabue Corp.**, subsidiary of **Weston Electrical Instrument Corp.**, 614 Frelinghuysen Ave., Newark 5, N. J. All of the firm's ASTM and standard grade thermometers are now shipped in these boxes where they are held in place by cardboard spacers. Complete specifications are printed on labels attached to the end of each box.

E. I. du Pont de Nemours and Co., Inc., Wilmington 98, Del., has discovered new forms of "Teflon" tetrafluoroethylene resin. According to the company, new forms of this plastic will enable many industries to utilize the material's extreme resistance to chemical corrosion and its ability to withstand high temperature. Not yet in commercial production, the forms include industrial fin-



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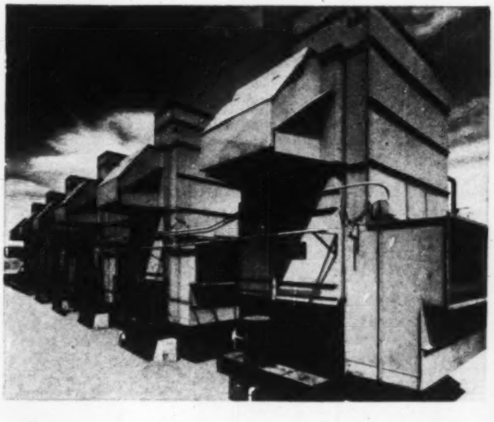

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By Modernizing Your Refrigeration With This New Condenser System

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In this new method the refrigerant gas passes through two cooling coils. The first coil, air-cooled, removes the superheat and condenses oil vapor from the refrigerant; the second condenses the refrigerant by the evaporation of a water spray from its surface. The heat is transferred to the air; less than 10% of the water used in conventional condensers is consumed and you save the cost of the water and the cost of its piping, pumping and disposal.

In addition the Niagara Aeropass Condenser controls the head pressure of your compressors at the lowest point for good operation, reducing your power bills. It does this automatically the year 'round, giving full capacity for peak summer loads and providing the greatest power saving in cold weather.

Hundreds of experiences in all industries that use refrigeration demonstrate these benefits and prove that they give a lasting improvement in refrigeration plant operation.

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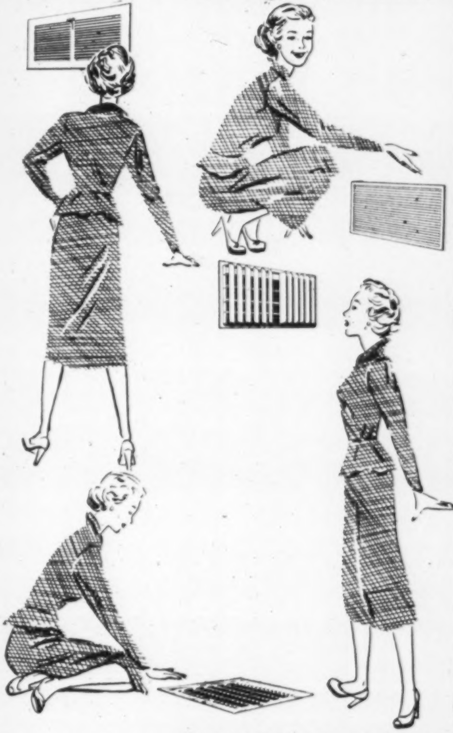
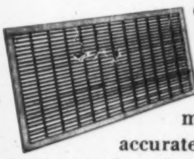


ARCHITECTURAL GRILLES



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ishes which may be applied with paint spraying equipment, enamels for insulating fine wire, compounds for extruding heavier insulation onto wire, unsupported plastic film of improved quality and thinner gages, and glass fabrics coated with the material. Uses indicated for the spray finishes include coatings for chemical pipes and fittings, for agitators, rupture disks in chemical process vessels, etc.

Typhoon Air Conditioning Co., Inc., 794 Union St., Brooklyn 15, N. Y., is now producing packaged air conditioning units of 15 and 20 ton capacities. According to the company, advantages in installations such as theatres are lower installation and equipment costs, "zone control" flexibility, and simplicity of installation of free standing units. .... **St. John X-Ray Laboratory**, Califon, N. J., has obtained a source of Cobalt 60, a new radioisotope to be used for industrial radiography in place of radium. Since it has a smaller focal spot size than the equivalent amount of radium, better results can be obtained, says the laboratory.

Landis Machine Co., Waynesboro, Pa., has developed an internal-trip type die head for threading valve seat rings up to diameters of 14¾ in. The die head is normally furnished without the internal trip when the valve seat rings are chucked and faced in relation to the chuck. This arrangement is said to permit setting the stops on the turret so as to allow the normal pull-off action to trip the die head. For thread sizes larger than 9-5/16 in. an enlarged closing ring is mounted on the head to support the oversize chaser holders. Varying thread lengths of different valve seat rings is taken care of by the height of the oversize holders.

A new "Nylo-Flex" low priced charging line is constructed of nylon braid and is available from **Techniflex Corp.**, Port Jervis, N. Y. Designed to withstand bursting pressures up to 1800 psi, it is nylon dipped for abrasion resistance and incorporates quick coupling connectors. .... **Todd Shipyards Corp., Combustion Equipment Div.**, Elmhurst, Long Island, N. Y., is now making available to manufacturers and others two standard models (portable and stationary) of its line of heated air generators, along with its line of combustion equipment. Standard "Thag" units are designed to supply up to 1000 cfm at 600 F. Special units are said to produce 40,000 cfm at 950 F and at 200 psi.

With its recently improved v belts and streamlined FHP v belt assortments, **Raybestos-Manhattan, Inc., Manhattan Rubber Div.**, Passaic, N. J., has introduced a new type dealer display rack for 40 belts with an "at-a-glance" inventory feature. The colored rack is designed for ready access to each belt without removing others on the rack. Also used are small wall racks holding 10 to 12 belts and display boards.

"Topflex" is a heavy duty identification tape developed by **Topflight Tape Co.**, Huber Bldg., York, Pa. Used for identifying and coding component parts, for warning and instruction labels, trade mark and merchandizing labels, etc., it is produced in a choice of six colors.

LOOK
at
ALTON

The ALTON Refrigerated Air Conditioner . . . available in capacities of 10, 15, 20 and 25 tons.

the Alton Refrigerated Air Conditioner!

Yes, look at the **ALTON** Refrigerated Air Conditioner and you'll see why! Why so many contractors have chosen this particular refrigerated air conditioner over all others. For this is the **ALTON,** the completely packaged unit with built-in Evaporative Condenser. No cooling tower to install, no elaborate installation required!

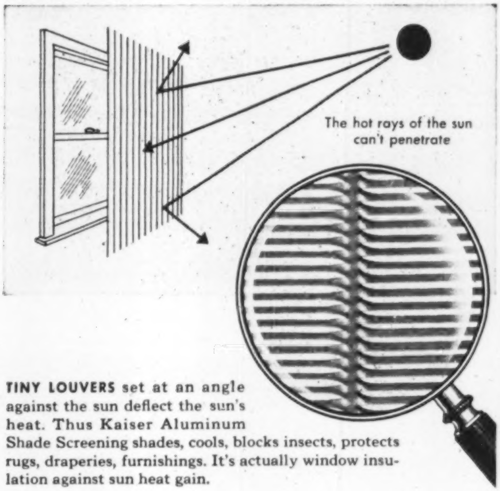
That's why you'll find the **ALTON** Refrigerated Air Conditioner being used in all sorts of buildings—churches, factories, business buildings of all sorts. Perfect refrigerated (dry) cooling and compactness has made the unit in its various capacities of 10, 15, 20 and 25 tons increasingly the contractor's favorite.

Small wonder, especially when you see the features that produce **ALTON'S** perfection performance, the easy installation (three simple connections—to ducts, electricity, water supply and drain) all described and illustrated in the folder, "The **ALTON** Refrigerated Air Conditioner". Like a copy for your file? Write to the address below and we'll send you one giving all information you require. No obligation, of course.

ALTON MANUFACTURING CO.
MANUFACTURERS AND ENGINEERS
1112 ROSS AVE. DALLAS, TEXAS

Look at the **ALTON** Refrigerated Air Conditioner on display at booth 313, Southwest Air Conditioning Exposition, Jan. 23-27.

New kind of screening boosts air conditioning sales!



TINY LOUVERS set at an angle against the sun deflect the sun's heat. Thus Kaiser Aluminum Shade Screening shades, cools, blocks insects, protects rugs, draperies, furnishings. It's actually window insulation against sun heat gain.

TYPICAL EXAMPLE OF HEAT REDUCTION WITH KAISER ALUMINUM SHADE SCREENING

Figuring 23 west windows 3½'x6'. Total area 3½'x6'x23 = 463 sq. ft. taking a 3:00 P.M. peak load, during midsummer at 40° Latitude.

	B. T. U. s
Sun load passing through unshaded windows	82,200
Sun load passing through Shade Screen	8,220
Reduced by	73,980
Refrigeration savings =	6.15 tons

Almost every home, office, industrial building becomes a potential customer for an air conditioning installation . . . *when you combine it with Kaiser Aluminum Shade Screening!*

Why? Because Kaiser Aluminum Shade Screening cuts room temperatures as much as 15° in hot weather. Thus smaller, less expensive air conditioning units can be used. You multiply customers, multiply *sales!*

Put this high-profit combination to work for you. Write today for free A.I.A. file and the name of your nearest jobber or contractor.

Kaiser Aluminum Shade Screening is produced by Kaiser Aluminum & Chemical Corporation.

Kaiser Aluminum

SHADE SCREENING

Sold by

Kaiser Aluminum & Chemical Sales, Inc., Kaiser Bldg., Oakland 12, California

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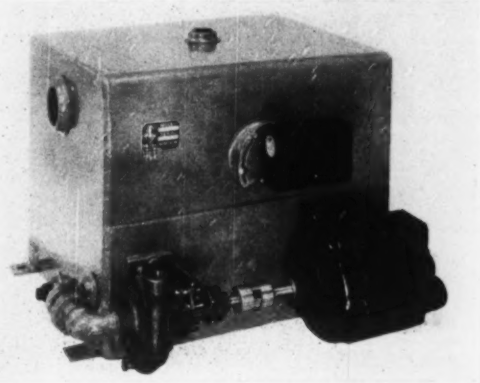
ANNOUNCING—

EAGAN "EAGLE" CONDENSATE PUMP



MATCH THIS FOR VALUE!

Here's the best condensate pump "buy" on today's market. It provides far more capacity than any similar pump . . . 8,000 sq. ft. EDR at 20 PSI . . . and it's only $124.00 (trade price).

Compare These Six Features

Mail coupon for full details

- √ **Low inlet, 2" IPS, 12" from floor**
- √ **All bronze centrifugal pump**
- √ **Flexible coupling**
- √ **Standard 1/3 HP capacitor motor**
- √ **Thermal overload protection**
- √ **Level indicating 2 pole float switch**

WALTER H. EAGAN CO., INC.

Mfgrs. of Condensate, Vacuum, Turbine, Boiler Feed and Centrifugal Pumps.

Pump Specialists since 1920

WALTER H. EAGAN CO., Inc. (Dept. B)
2336 Fairmount Avenue
Philadelphia, 30, Pa.

SEND ME FREE DESCRIPTIVE BULLETIN OF THE NEW EAGAN "EAGLE" CONDENSATE PUMP

NAME ....

COMPANY ....

STREET ....

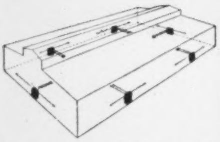
CITY .... ZONE ... STATE ......

Direct Fired

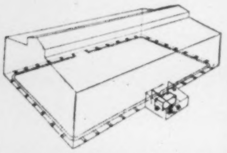
WARM AIR HEATERS*

by LEE

* a COMPLETE line for every application



One or more heaters is placed inside of the space to be heated.

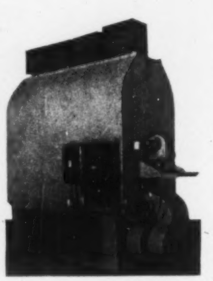


Heater is placed in a central location, warm air being delivered by ducts to space heated.

Whatever your needs in large scale heating you will find a Lee Direct Fired Unit to handle the job efficiently and economically. Over thirty years of experience in building quality heaters guarantees the proper unit for the job whether you contemplate a unit or central system. Illustrated at left are the two types mentioned — the top diagram shows an installation using one or more heaters in which capacities from 300,000 to 6 million Btu may be obtained. The bottom diagram illustrates the central system in which the heated air is distributed through ducts in which 3 million to 8 million Btu may be developed.

The efficiency of the Lee counter-current flow reduces fuel consumption; while the rugged simplicity of the system decreases cost of installation, assures low maintenance charges, and also provides ventilation without additional cost. In addition to normal heating installations Lee Direct Fired Units may also be used for drying and curing in cases where these two operations are required.

It will pay you to investigate the Lee line today—literature is available describing completely the principal types of construction and versatility of operation as well as a partial list of prominent and satisfied Lee customers.



Please write us today.

LEE ENGINEERING COMPANY

95 River Street Hoboken, N. J.

WHO'S WHAT

At its recent 45th annual meeting, the **American Society of Refrigerating Engineers** elected **John G. Bergdoll, Jr.,** president for 1950. He has been active in society affairs for a number of years and is vice president and general works manager of York Corp. Other officers who will serve with him are: vice president—**Paul B. Christensen,** Merchants Refrigerating Co., New York City; vice president—**Edward Simons,** consulting engineer, San Francisco; and treasurer—**R. C. Jordan,** professor of mechanical engineering, University of Minnesota.

Paul M. Arnall is now vice president and general manager of **Lunkenheimer Co.,** Cincinnati. Accordingly, the functions of president and general manager are now divided. For the past several years he has been executive vice president and a director of Ohio Injector Co. . . . . **Ralph S. Penn** and **E. B. Maire** have been elected vice presidents of **Penn Electric Switch Co.,** Goshen, Ind. Active in the firm since 1937, Mr. Penn has served as manager of several branch offices. Mr. Maire, who joined the company in 1934 and was formerly district manager in the Chicago office, now returns to the firm after three and one half years in other phases of the control industry.

As the new vice president and general sales manager, **Carl W. Priesing** is directing the coordination of all selling and merchandising activities of **Dayton Rubber Co.,** Dayton, Ohio. He comes to the firm from Ansco Div., General Aniline and Film Corp. where he was general sales manager. **Leonard C. Strobeck** is vice president in charge of mechanical sales and **Herbert S. Waters,** recently named vice president and director of products, is in charge of merchandising and the preparation of products, other than tires, for the market.

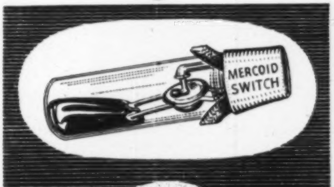
The new general manager of sales for **Spang-Chalfant Div., National Supply Co.,** Pittsburgh, is **Edwin A. Booth.** He has been a member of the National Supply organization since 1929, recently as manager of the Pittsburgh district sales office. . . . . **Paul R. Duffey,** power engineer for Youngstown Sheet and Tube Co., has been elected a Fellow of the **American Society of Mechanical Engineers.** This honor is bestowed on an outstanding member who has qualified as a nominee and who has acknowledged engineering attainment. He has specialized in industrial power plant engineering and has closely followed the development of high pressure, high temperature steam generators and their station auxiliaries.

Westinghouse Electric Corp., Pittsburgh, recently announced three promotions. **F. P. Taugher,** formerly engineering and service manager in the New England district, is now manager of engineering for the industrial control division, in Buffalo. **A. A. Johnson** is managing central station engineering in the industry engineering department. Since 1941 he has handled consulting engineering problems for electrical utilities and manufacturing plants and now succeeds **Dr. Charles F. Wagner** who has been named consulting engineer for the company. The welding department is now headed by **J. O. Clevenger,**

It is not what we say—
but what they do
that counts

The best advertising of
MERCOID CONTROLS
is in their performance

MERCOID
SWITCH



MERCOID CONTROLS ARE EQUIPPED WITH MERCURY SWITCHES, THEREBY INSURING GREATER SAFETY, BETTER PERFORMANCE AND LONGER CONTROL LIFE

MANUFACTURERS OF AUTOMATIC CONTROLS FOR HEATING, AIR CONDITIONING, REFRIGERATION AND NUMEROUS INDUSTRIAL APPLICATIONS. ALSO MERCOID BRAND MERCURY SWITCHES.

☆ WRITE FOR CATALOG 600-B. PLEASE MENTION THIS PUBLICATION ☆

THE MERCOID CORPORATION • 4201 BELMONT AVE. CHICAGO 41, ILL.

FOR EXHAUSTING DANGEROUS FUMES

...INSTALL DeBOTHEZAT BIFURCATOR FANS

COMPLY WITH STATE HEALTH REGULATIONS
PROTECT YOUR EMPLOYEES AND EQUIPMENT

DeBothezat Bifurcator Fans are specially designed for exhausting toxic, inflammable or explosive fumes. These direct drive fans have their motor mounted in a separate chamber. Destructive fumes are by-passed (bifurcated) around the motor, which remains cool, clean and easily accessible.

Bifurcator Fans can be installed at any angle. They install just like a section of ductwork, requiring no special platforms or supports. Available in a wide range of sizes with capacities from 1090 to 43,200 cubic feet of air per minute.

Send for Free Catalog

For selection of the right Bifurcator for a job, capacities, dimensions and specifications, send for free, illustrated Bifurcator catalog.

NEW BULLETIN ALSO AVAILABLE ON SPECIAL INDUCED DRAFT BIFURCATORS FOR BOILERS.

DE BOTHEZAT FANS DIVISION, Dept. H-13
AMERICAN MACHINE AND METALS, INC.
EAST MOLINE, ILLINOIS.

Please send Bifurcator Catalog without obligation.

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NOW! COMPLETE LINE!

Rittling CABINET CONVECTORS

- DECOR
- COMFORT
- HIGH QUALITY
- EFFICIENCY
- FUEL ECONOMY
- LOW COST

- *Front panels easily removable; require no tools.*
- Free standing — semi and fully recessed; sloping and flat-top wall hung.
- Manufactured, tested and rated in accordance with Commercial Standard CS 140-47.

MANUFACTURERS OF FINNED TUBE SURFACES

RITTLING BASEBOARD HEATING (Reg. U. S. Pat. Off.)

FINNED TUBE CONVECTOR RADIATORS

COILS

UNIT HEATERS

Sold Through Wholesalers Only. Write for Catalogs.

THE Rittling CORP.

1292-1298 Niagara St., Buffalo 13, N. Y.

formerly located in Atlanta as manager of agency and specialty sales for the southeastern district.

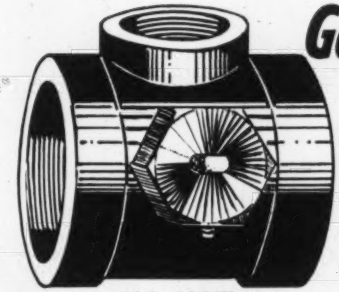
O. J. Prentice, director of publicity and public relations for **C. A. Dunham Co.**, retired December 31. Widely known in the heating, ventilating, and air conditioning industry, he had been with the company 30 years. .... **John E. Harris** has been named technical adviser to the vice president for manufacturing, **National Radiator Co.**, Johnstown, Pa. He joined the firm in 1943 as plant superintendent of the plastic metals division. **S. W. Foulger** is the new sales representative in Salt Lake City. He has been associated with Thermal Engineering Co., Utah.

John Cherry has joined **C. L. Bryant Corp.**, Cleveland, as chief engineer. He had been factory manager of Lennox Furnace Co. and its American Metal Products Division, both located in Fort Worth, Tex. .... **Harry S. Thompson** has been named general works manager of **American Furnace & Foundry Co.** and **American Boiler & Foundry Co.**, Milan, Mich. He has been active in foundry reorganization, expansion, and modernization programs and was formerly with several foundry management consulting firms.

In the newly created post of manager of sales engineering, **William W. Martenis** will assist in planning specifications, approve new developments, and coordinate activity between the sales and engineering departments of **Minneapolis-Honeywell Regulator Co.**, Minneapolis. He has been chief application engineer. **Kent L. Wilson**, southwestern regional manager since 1948, is now in charge of the firm's newly formed manufacturers' division. **T. S. Carley**, who has been Detroit branch manager, succeeds Mr. Wilson as head of the Honeywell-Brown office in Dallas. Former southwestern regional manager **Karl Schick** has rejoined the firm after a year as a distributor for several companies in the Dallas area. He is now sales manager of the company's gas controls division. **J. A. DePuy**, branch manager of the Cincinnati office, has succeeded Mr. Carley as Detroit manager, and **Jack Richardson**, who has been manager of the industrial division's sales department in Detroit, has taken over Mr. DePuy's post in Cincinnati. **James Dunlap**, of the Toledo office, has been named industrial division sales manager in Detroit, and **Harry Merkel**, of the Pittsburgh branch office, is in charge of industrial sales in Toledo.

The new industry manager of **Reynolds Metals Co., Building Products Division**, Louisville, Ky., is **Duncan A. Brownlie.** He has been regional manager for the division on the west coast, with headquarters in San Francisco. In the general sales division, **Stuart Smith** has been named product manager of sheet and plate sales. He had been manager of aircraft sales with headquarters in Dayton. .... **George W. Walker**, industrial designer of Detroit, has been engaged by **United States Radiator Corp.**, Detroit, and its **Pacific Steel Boiler Division.** He has begun extensive restyling of products.

Fairbanks, Morse & Co., Chicago, has made several changes in its sales organization. **J. A. Cuneo**, formerly branch manager in Los Angeles, has been transferred to manage the Chicago branch. **A. M. McLaren** succeeds him



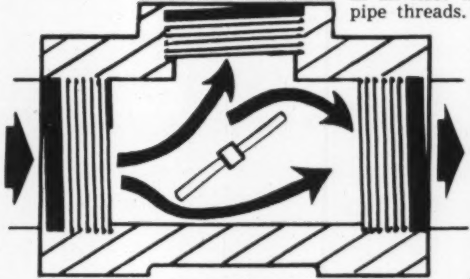
U.S. Pat. 2,247,972
Can. Pat. 410,129

GOLD TOP POSITIVE DISTRIBUTION FITTING

allows proper amount of water to each radiator . . .

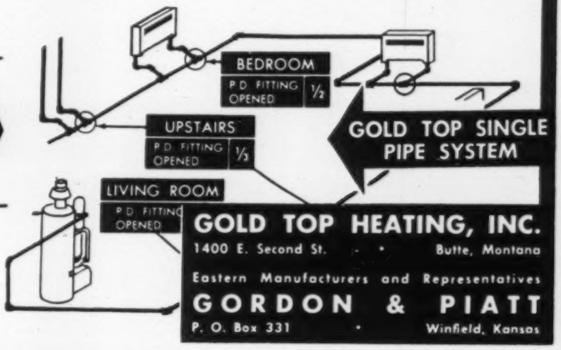
Regardless of type of house construction, boiler location, or remoteness of rooms, Gold Top P.D. (Positive Distribution) System assures perfect hot water balance by providing adjustable water flow control for radiators. Also used to good advantage to compensate for friction in branch lines.

Gold Top P.D. Fitting can be used with radiators or convectors of any size or type. Each fitting finely machine threaded and tested. Made in all sizes the same measurement as a standard tee with standard pipe threads.



P.D. (POSITIVE DISTRIBUTION) FITTING

(can't be installed backwards)



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1400 E. Second St. • Butte, Montana

Eastern Manufacturers and Representatives
GORDON & PIATT
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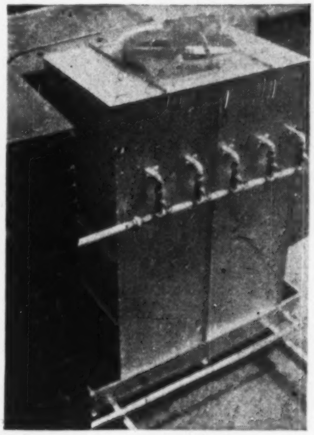
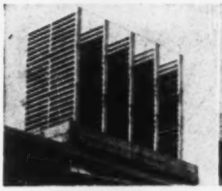
TRAY COOLING TOWERS

SAVE 98% of CONDENSER WATER COSTS wasted thru REFRIGERATION and AIR CONDITIONING PLANTS

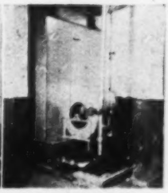


COOLING TOWER ABOVE—40 Tons Refrigeration Capacity. 120 GPM. Induced Draft—Outdoor Unit.



ATMOSPHERIC UNIT
WORCESTER, MASS.

INDUCED DRAFT
COOLING TOWER
PHILA., PA.



INDOOR COOLING
TOWER,
BROOKLINE, MASS.

TRAY COOLING TOWERS *offer*

- ★ ALL STEEL CONSTRUCTION
- ★ PACKAGE UNITS—REQUIRE LESS SPACE
- ★ OPEN DISTRIBUTOR HEADER — NO NOZZLES requires less horsepower for recirculating pumps.
- ★ INDOOR and OUTDOOR UNITS

Send for
BULLETIN H-50

Some open territory for factory representatives

NEW ENGLAND COOLING TOWER CO. 88 Broad Street
BOSTON 10, MASS.

in Los Angeles. **John S. King,** who formerly managed the Chicago branch, is now Cincinnati manager, succeeding **J. S. Peterson** who has been transferred to Chicago and is attached to the sales manager's office. **William H. Kingsley,** for the past 12 years district manager in the New York office of Ideal Electric & Mfg. Co., has joined Fairbanks, Morse as manager of its electrical division, with headquarters in the Chicago executive offices.

Herman Nelson Corp., Moline, Ill., has made several recent changes in its sales staff. **W. N. Murray,** who joined the firm in 1928 as representative in the Boston sales territory, is now New York regional sales manager supervising activities in the Boston, New York, Syracuse, Buffalo, and Philadelphia territories. He is maintaining headquarters in Boston. **Robert K. Roulston,** who was with B. F. Sturtevant Co. before the war, is the new manager of the Boston branch office. Associated with him are **Richard M. Burbank** and **Philip A. Boulton** who maintains the Springfield, Mass., office. The staff of the Washington, D.C., office has been increased by the addition of two product application engineers, **William G. Maynard,** in charge of the Baltimore office, and **Richard Gochnauer,** who will work with **James M. Osborne,** manager of the Washington office. **James W. Heck** has joined the Cincinnati office.

Black & Decker Mfg. Co., Towson, Md., has moved its Atlanta factory sales and service branch to a new building at 316 Techwood Dr., N. W. **A. Lee Proctor** is in charge. .... **Tinnerman Products Inc.,** Cleveland, has named **Eric Dudley** manager of aviation development and manager of the Pacific coast district. He has served since 1946 as a sales engineer in the Detroit office. He has been a member of the SAE technical subcommittee on aeronautical material specifications, formerly served on the War Production Board, and was national chairman of the National Aircrafts Standards Committee.

Charles C. E. Harris, Arlington, Mass., has been reelected president of the **International Refrigeration Service Engineers Society.** Other officers serving with him are: first vice president—**Carl Neisel,** Corpus Christi, Tex.; second vice president—**Cecil Visger,** Kansas City, Mo.; treasurer—**M. R. Hanks,** San Diego; secretary—**H. T. McDermott,** Chicago; sergeant-at-arms—**J. D. Nall,** Miami, Fla.; chairman of the educational and examining board—**John H. Spence,** St. Louis. .... **J. C. Veltman** is now sales manager of the Chicago branch retail sales for **Iron Fireman Mfg. Co.,** Cleveland. He has been in stoker sales work for 21 years.

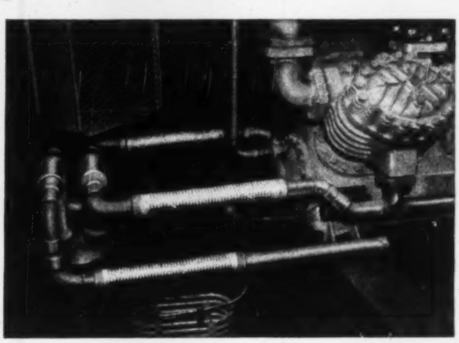
With headquarters at 324 Sun Bldg., Boise, Idaho, **H. George Richardson** is sales representative in southern Idaho for **National Radiator Co.,** Johnstown, Pa. He is also branch manager of Thermal Engineering Co., Boise. .... **General Controls Co.,** Glendale, Calif., has opened three new factory branch offices. Managers are: **R. Roger Rosell, Jr.,** Minneapolis; **Paul A. Palmgren,** Buffalo; and **Fred H. Angier,** Baltimore. .... **A. O. Smith Corp.,** Milwaukee, has transferred sales activities for welding electrodes and equipment from its north

Another Problem **SOLVED**

ELIMINATING COMPRESSOR VIBRATION

with Bendix

Eclipse Flexible Metal Hose



Twenty-four-hour operation of a huge icebox for cold testing (to −83° F.) aircraft instruments, plays a vital role in maintaining the supply line to today's multi-engined and supersonic aircraft. Greater assurance of a continuous duty refrigerating plant was given with the installation of Bendix Vibration Reducers for absorbing compressor vibration. Manufactured from seamless drawn tubing, the deep parallel corrugations and uniform wall thickness assure maximum flexibility and service life. Bendix Vibration Reducers in standard sizes—all chemically cleaned and sealed—are available from stock. Special assemblies can be engineered to your requirements. Write today and let our engineers work out your problem with you.

LOOK FOR THE ECLIPSE MARK OF QUALITY

ECLIPSE-PIONEER DIVISION
BENDIX AVIATION CORPORATION
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Bendix AVIATION CORPORATION

Canadian Representative: The Holden Co., Ltd., 614 St. James Street, West Montreal 3, Canada

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in a hurry!

Where sudden hot water pulls—or an unpredictable time schedule—are in the order of things, install

Paracoil INSTANTANEOUS WATER HEATERS

TO KEEP PACE WITH THE LOAD—ALL THE WAY!

No storage tank is necessary—they have enough, and more, heating surface built into them to heat the water as fast as it is drawn! Thousands in use.

If you have such a problem, we have the answer! Stock designs permit quick deliveries...at prices lower than you think!

Write today for a copy of our new Bulletin 70 Section I, describing this line of Paracoil Water Heaters.

This bulletin, in addition to tables of capacities and physical dimensions on our U-Tube designs, contains a wealth of practical, worthwhile engineering data on how to size, figure steam requirements, and pipe up PARACOIL INSTANTANEOUS WATER HEATERS. YOUR COPY AWAITS YOU!

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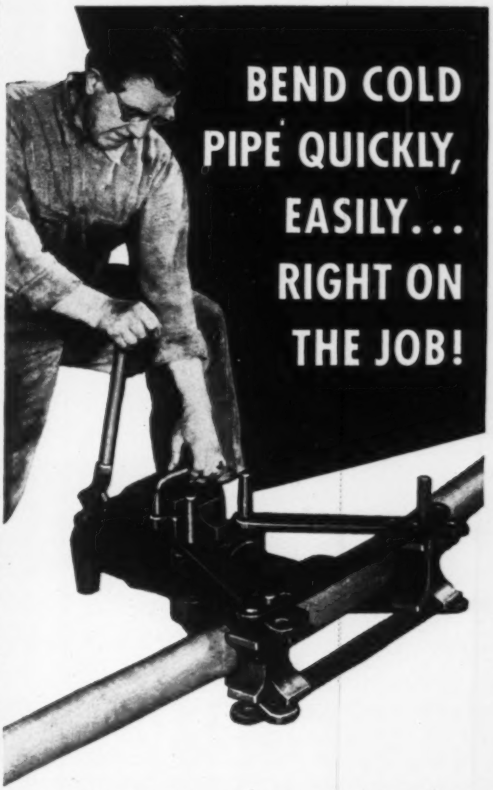

BEND COLD PIPE QUICKLY, EASILY... RIGHT ON THE JOB!

with a GREENLEE HYDRAULIC BENDER

Yes, make pipe bends "right on the job" . . . exactly where and when you need them! And do the job swiftly, accurately with a GREENLEE Hydraulic Pipe Bender.

Bends pipe up to 4½". Simple to operate, easy to carry, set up and shift from job to job. With a GREENLEE *one man* makes smooth, precise, uniform bends in but a few minutes. Speeds your piping installations, cuts costs on labor and materials. In timesavings alone, the GREENLEE pays for itself quickly.

Ideal for radiant heating jobs, too. For complete details write for free Bender Booklet E-201. Greenlee Tool Co., Division of Greenlee Bros. & Co., 2341 Twelfth Street, Rockford, Illinois.

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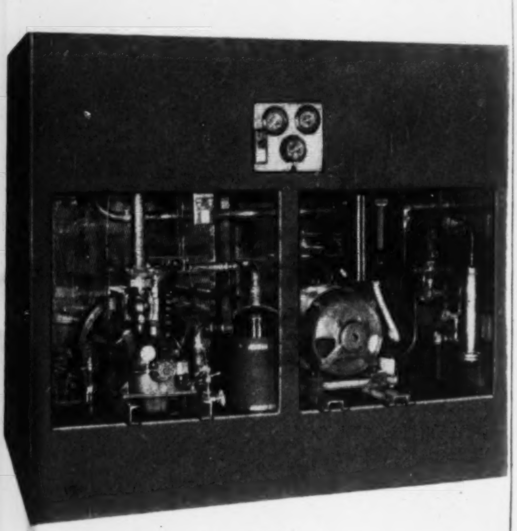
GREENLEE

HI-VOLUME

LO-COST



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"PACKAGED"

LIQUID COOLER

Check these features against your needs

Applicable from 5-100 tons of refrigeration. Available in materials to meet specific conditions. High and low temperature. Instantaneous cooling. Easy and economical installation and operation.

Applicable for:

Jacket water cooling, brine and other liquid chemical cooling, recirculating water systems, vegetable oil cooling, air conditioning, etc.

For further information consult:

DOYLE & ROTH MFG. CO.

150 - 24th St.

BROOKLYN 32, N.Y.

central district, Chicago, to the welding electrode and equipment division, Milwaukee. The move is designed to bring customer sales and technical service closer to the research and production facilities. **L. F. Vonier,** with the firm 14 years, has been named general sales manager for the division.

W. Ned Rast and **Joseph P. Cain** are now respectively manager and assistant manager of the Dallas branch office of **Bryant Heater Div., Affiliated Gas Equipment, Inc.,** Cleveland. Mr. Rast was formerly with Catlett Engineers and Mr. Cain was factory representative for the Bryant east Texas territory. .... **Robert J. Jones,** formerly Philadelphia district manager, is now New York district manager for **Power Plant Equipment Div., Swartwout Co.,** Cleveland. **Richard J. Frost,** who has been assistant district manager in Philadelphia, is now in charge of that office. The New York office under Mr. Jones now functions as a factory sales branch office.

Elco Tool & Screw Corp., Rockford, Ill., has appointed **Charles L. Kerr** representative in the eastern half of Ohio and the western sections of New York and Pennsylvania. He is affiliated with Kerr-Lakeside Industries, Inc., Cleveland, and has had over 23 years of experience in the fastening field. .... As a new representative for **Nu-Way Corp.,** Rock Island, Ill., **C. H. Schuettenberg** is covering the states of Missouri and Kansas. His sales experience has been with a number of manufacturers of heating equipment. .... **J. Robert Bunch** has been assigned to the Cleveland sales office of **American Wheelabrator & Equipment Corp.,** Mishawaka, Ind. For the past four years he has supervised the erection and servicing of company products in the Cleveland area. .... **Homer M. Bird** has opened an office for the general practice of mechanical engineering in Osseo, Minn.

Covering Philadelphia and surrounding territory, **Enterprise Combustion Engineering Co., Inc.,** 4024 Filbert St., Philadelphia, is a new distributor for **Ray Oil Burner Co.,** San Francisco. Enterprise was established in 1937 by **James A. Vail,** president and sales manager, and **Harold Penney,** vice president in charge of engineering. .... **Vernon J. Carns** has been promoted to Phoenix branch manager of **Boyd Engineering Co., Inc.,** southwest representative for a number of manufacturers of heating, ventilating, and air conditioning equipment. He joined the organization in 1947 as a control specialist after 10 years with Minneapolis-Honeywell Regulator Co. .... **Niel N. Dahl** joined **Harry F. Haldeman, Inc.,** Los Angeles, in 1947 as a sales engineer. He is now sales manager of this firm which is a southwest distributor of heating, ventilating, and air conditioning equipment. Mr. Dahl has long been associated with west coast air conditioning.

Don E. Hawk Associates, New York sales engineers, have opened a New Jersey office at 51 Clinton St., Newark 2. **Harry A. King** is in charge of the branch which represents a number of well known manufacturers of heat transfer coils, air conditioners, condensers, cooling towers, air dryers, electrostatic air filters, registers, and grilles.

The UNITED
CLIME-MATIC
SELF-CONTAINED

air conditioning unit

For Distributors Who Can Qualify—Here's

The Most Valuable Air-Conditioning Franchise in America!

1. Because United CLIME-MATIC is a truly great unit . . . compact, efficient, adaptable . . . that provides dealer and consumer the last word in trouble-free service.

2. Its design is the result of years and years of field experience by practical contractors, and it is available in 3, 5 and 7½ ton units.

3. CLIME-MATIC meets ANY competition. Enthusiastic consumers are your dealers' best salesmen. CLIME-MATIC installations include many top names in American business.

4. Better-than-average profits . . . continuing profits . . . sales that build more business.

PLUS A Sound, Basic Sales Policy That's Fair —that you can depend on . . . and upon which you can build business

1. No "Box Car" sales quotas.
2. No "master minding" sales executives telling you how to run your business.
3. An understanding of your problems and needs, and that of your dealers.
4. Intelligent, helpful promotion.
5. A pledge to produce the finest, most saleable, air-conditioning apparatus in the country.
6. Territorial protection.

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You can if your area is still available . . . if you have demonstrated your sales ability—and your financial stability.

UNITED CONDITIONING CORPORATION
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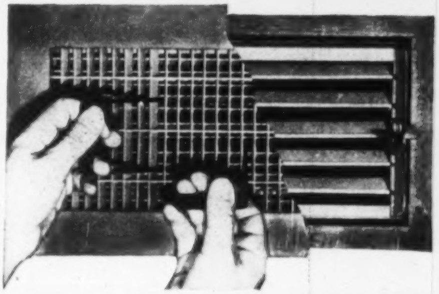
GOOD NEWS!

REGISTER & GRILLE CO.
Standardizes 14 Different Styles for Air Conditioning

Brooklyn, N. Y. Jan. 1950—The Register and Grille Mfg. Co., Inc., makers of Registers and Grilles, announces the standardization of 14 different styles of units for Air Conditioning; effective immediately. This should be good news for Architects, Engineers and all Contractors in the Building field.



Pictured above is the Register and Grille Company's Supply Register, Style 420, featuring adjustable Horizontal and Vertical Deflection with Volume Control Shutter.

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This Coat of Arms stands for Highest Standards of Service and Quality, Skill and Integrity of the Artisans of this Company and over Two Hundred Years of combined Executive "know-how."

REGISTER & GRILLE MFG. CO., INC.
70 BERRY STREET, BROOKLYN 11, N. Y.

NEW BOOKS & REPORTS

Gives Numerical Methods for Calculating Heat Flow in Solids

Numerical Analysis of Heat Flow, by G. M. Dusinberre, professor of mechanical engineering, Pennsylvania State College, is a new text presenting finite-difference methods which are free from many of the limitations of conventional differential analysis.

Many engineering problems involving the flow of heat within solid bodies and across their boundaries can be solved in a number of ways, such as full scale experiment, experiment on models, calculation, and graphs or tables prepared by one of these methods. The latter are rapid and convenient only when the problem falls within a restricted range of geometrical shapes, physical properties, and boundary conditions.

Calculation is often the preferred method of solution, but the physical properties of the material and the manner in which heat is transferred across its boundaries must be known. This information may be the most doubtful part of the work. In addition, certain approximations must be made. One is to regard a solid material as homogeneous, as infinitely subdivisible. This, of course, makes possible the methods of calculus. The author refers to this treatment as the analytical method. Another approximation is to represent the material by a finite network of points. This treatment is referred to as the numerical method.

Techniques for both steady state and transient problems are given and compared. Judicious selection and combination of techniques are stressed and problems are presented giving examples of such combination.

The book is not for the casual reader. It offers a "tool" which requires study and practice before it is useful. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, it contains 226 + xiv pages, 6 x 9 in., and is priced at $4.50.

Provides Design Data for Hydro-Pneumatic Pressure Systems

The optimim design of a larger (above 3 hp) hydro-pneumatic pressure system is dependent on such related factors as type and size of pump, size of tank, minimum and maximum percentages of the tank to contain air, and the desired control. Hydro-pneumatic Pressure Systems is the title of a 30 page manual on the proper selection of equipment. Information is compiled in a concise manner and is documented with working charts, tables and drawings to facilitate the solution of actual problems.

Leading off with general descriptions of shallow well, deep well booster type, combination type, and cushion tank type systems, the booklet presents water consumption factor tables for finding pump capacities. The determination of pump working pressures, together with tank pressure, capacity, and size are covered. In the chapter on components, detailed information is given on tank construction, piping, fittings, operation, and control. Following a number of drawings showing typical systems, a chapter on auxiliary equipment covers air volume con-

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says Frank M. Kriwanek, General Manager, La Brea Heating and Air Conditioning Co., Los Angeles, Calif.

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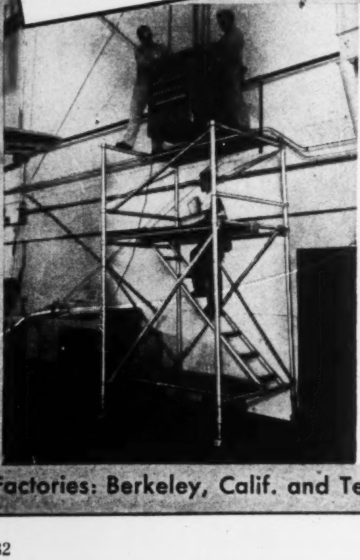
UP-RIGHT SCAFFOLDS



Saves scores of man-hours on all installation and maintenance jobs. Requires one man only a minute per section to erect. Available in desired number of 6 foot or shorter section units. Rolled easily from position to position. Stronger than structural steel yet one third the weight. No wrenches, wing nuts, bolts. Each section folds flat.

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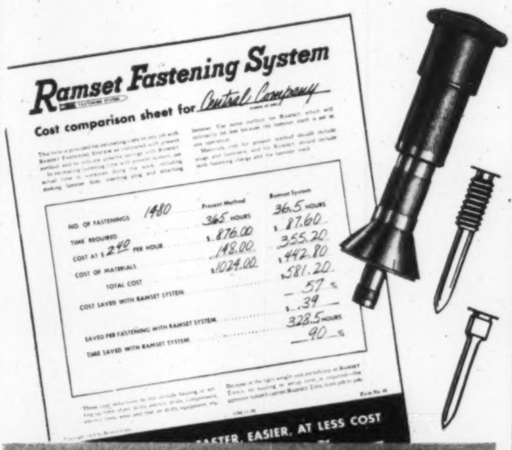

Ramset Fastening System

Cost comparison sheet for Central Company

		Present Method	Ramset System
NO. OF FASTENINGS	1480		
TIME REQUIRED		365 HOURS	36.5 HOURS
COST AT $ 2.40 PER HOUR		$ 876.00	$ 87.60
COST OF MATERIALS		148.00	355.20
TOTAL COST		$ 1024.00	$ 442.80
COST SAVED WITH RAMSET SYSTEM			$ 581.20 57 %
SAVED PER FASTENING WITH RAMSET SYSTEM			$ .39
TIME SAVED WITH RAMSET SYSTEM			328.5 HOURS 90 %

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57% SAVED

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Ramset

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compare your fastening costs...
see what Ramset can save...

If you fasten or anchor work into steel, concrete, masonry or other hard materials, use RAMSET'S free Cost Comparison Sheet and see for yourself what you can save with RAMSET. Just fill in your figures and compare slow, costly, laborious drilling, chipping, plugging and tapping with lightning fast, simple, economical RAMSET FASTENING SYSTEM.

Less than a minute, from start to finish, is needed to set any one of 65 different RAMSET drive pins or threaded studs. Simply READY the light, portable RAMSET TOOL, place the tool against the work—and RAM! The fastener is SET instantly, tightly, easily!

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Ramset System

SAVES TIME...CUTS COST ON JOBS LIKE THESE:

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- Duct work.
- Metal radiator reflectors.
- Sheet metal work.
- Refrigeration lines.
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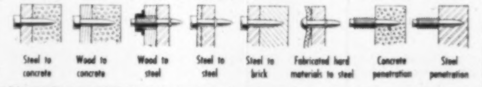
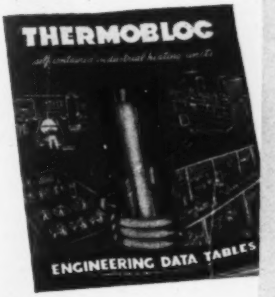


Here's information you've been Looking for!



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- Heating constants.
- Procedure to determine heat load.
- Procedure to estimate fuel consumption.
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- Comparison of Thermobloc equivalents of steam radiation, steam capacity and horsepower.

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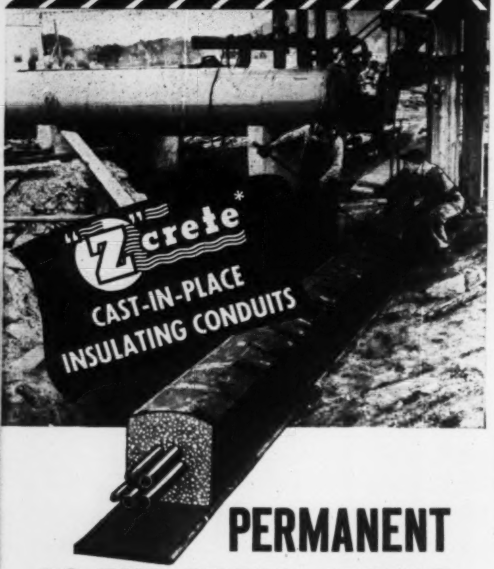

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Identified as Bulletin B-579, the paper covered booklet has been prepared by Peerless Pump Div., Food Machinery and Chemical Corp., 301 West Ave. 26, Los Angeles 31.

Says Thermal Stresses in Metals from Cycling Service Temperatures Important

Some Engineering Problems Associated with Metals in Elevated Temperature Service, by F. G. Sefing, development and research division, International Nickel Co., Inc., draws attention to some of the high temperature effects up to 1000 F, usually disregarded in engineering thinking.

Presented at the recent fall meeting of the American Society of Mechanical Engineers, the paper gives special consideration to the importance of associating failures of, and changes in, metals in elevated service with the changes in properties under these conditions from those prevailing at room temperatures. Thermal stresses resulting from cycling of service temperatures or occasional heating and cooling are shown to be of threatening proportions. In addition, these thermal stresses often tend to concentrate to certain areas in the design, thus exceeding the fatigue limit or the tensile strength of the metal.

Changes in metal structure with time at temperatures up to 1000 F can and do occur. According to the author, the use of specially designed alloys to prevent these metallurgical changes is the sensible approach to such problems. Wear resistance in cylinders, and other metal-to-metal wear service, is reviewed as affected by elevated temperatures. Likewise, abrasive wear resistance is explained to change materially with elevated temperatures because of the many factors other than hardness involved.

Internal stresses of equipment resulting from fabrication can be released at elevated working temperatures, often resulting in distortion with time. The importance of stress relief annealing to permit of greater working stresses is reviewed, with examples.

The paper is identified as No. 49-F-14. Copies may be obtained from Society headquarters, 29 W. 39th St., New York 18.

Other Books and Reports Received

Papers on Smoke Prevention—Twenty-three papers presented at the 42nd annual meeting of the Smoke Prevention Association of America, Inc., have been assembled into a 188 page, paper covered book now available from the publisher, John Paul Taylor, 520 Pleasant St., St. Joseph, Mich, for $2.00.

Recommended Standard Sizes for Vaneaxial and Tubeaxial Fans, Bulletin 109—Prepared by the National Association of Fan Manufacturers, Inc., 2159 Guardian Bldg., Detroit 26. Sizes given represent the consensus of the industry. Last June members of the association approved the standards for their own use. However, no manufacturer is expected to redesign his line now as the purpose is to enable a manufacturer to work toward a definite goal when subsequent changes are contemplated or when a new line is brought out.

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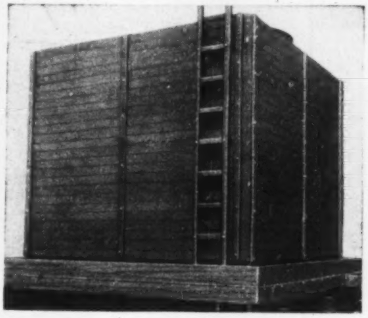
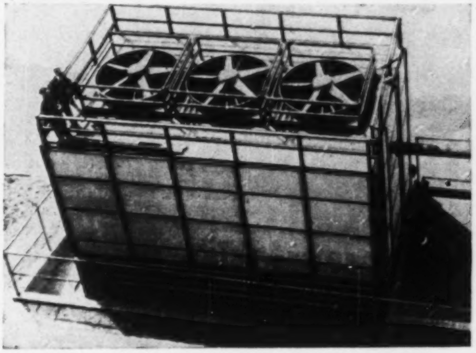
Complete line includes small "package" type spray towers at low standardized prices as well as mechanical draft equipment of any required capacity.



Series A, for air conditioning. Direct drive, induced draft, prefabricated. Capacities from 25 to 150 tons.



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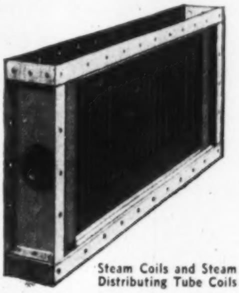
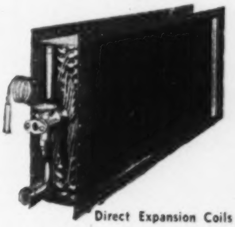
Down through the years, heating and cooling coils made by the Super Radiator Corporation have led the field, both in new developments and in superior construction. Our advantage of exclusive patents—our exacting standards of workmanship—and our use of only the finest materials guarantees a quality product conservatively rated that will give years of trouble free service at a price comparable with that of ordinary coil construction.



Steam Coils and Steam Distributing Tube Coils

Water Coils



Direct Expansion Coils

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Style Manual for American Standards—Offered by the American Standards Association, 70 E. 45th St., New York 17, it is a guide to bring about greater uniformity in the presentation of technical data. Principal sections include suggestions for outline form and numbering, capitalization, punctuation, spelling, abbreviations for technical terms, use of italics, a few simple rules for tables and illustrations, a standard bibliographical style, and general format. Although intended primarily for use by the association's technical committees, it is of value to any organization responsible for editing and publishing technical documents. Copies are available for $1.00, with discounts offered on quantity orders.

National Fuel Efficiency Program During the War Years 1943-45, by J. F. Barkley, Thomas C. Cheasley, and K. M. Waddell. Issued by the U. S. Bureau of Mines and identified as Bulletin 469, it is a 100 page paper covered booklet available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., for 35 cents. It covers the organization, personnel, methods of operation, and accomplishments. Annual fuel savings shown were 5 million tons of coal, including oil and gas equivalents. Representative savings are tabulated.

Basic Models for Technical Drawing, Bulletin No. 115 of A. & M. College of Texas, College Station, Tex. Prepared by J. G. McGuire, professor, R. L. Burton, assistant professor, and P. M. Mason, instructor, department of engineering drawing, this 34 page booklet shows details of construction of plastic models used as teaching aids.

MEETINGS & CONVENTIONS

American Society of Heating and Ventilating Engineers, 51 Madison Ave., New York 10—56th annual meeting, Adolphus and Baker hotels, Dallas, Tex., January 23 to 26. For additional information see the special Show Section in this issue.

Southwest Air Conditioning Exposition of the International Heating & Ventilating Exposition—State Fair Grounds, Dallas, Tex., January 23 to 27. As in past years, the show will be managed by International Exposition Co., Grand Central Palace, New York City, and will be held under the auspices of the American Society of Heating and Ventilating Engineers. A preview of this affair, including the list of exhibitors, is contained in the special Show Section of this issue.

Air Pollution Short Course—University of Michigan, School of Public Health, Ann Arbor, Mich., February 6 to 8. Designed especially for the benefit of air pollution control and other public officials, industrial chemists, engineers, and management, industrial hygiene personnel, and sanitary engineers, the course is open to others interested in the subject. Lectures scheduled will deal with such factors as physiological effects, contaminants, dilution, air cleaning devices, and pollution and controls. A large number of well known authorities will present talks and act as moderators of panel sessions.

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Fig. 302

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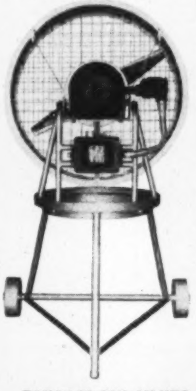

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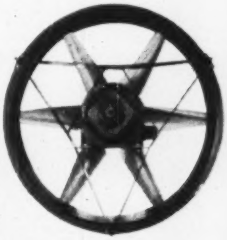
For general or specific ventilation, man-cooling, or parts-cooling—to increase personnel efficiency and decrease lost time in cooling and drying hot parts. Portable. Direction of blast adjustable. Explosion-proof motor, metal conduit and starter can be supplied. Conforms to state safety regulations.



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Six Blade model illustrated. For exhausting or blowing against high static pressures. For general ventilation or specific processes where fumes are present. Sizes: 16 to 36 in. dia. Capacities: 1240 to 26000 c.f.m. Two and four blade models for applications at lower static pressures.

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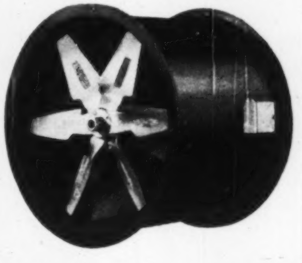
For exhausting explosive gases or fumes . . . For circulating "hot" gases up to 350°F. where temperature is too high to permit use of standard or even special motors. Used in heat exchangers—"sweater" ovens, etc. Fans from 16 to 36 in. diameters.



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Direct drive model shown; also supplied with belt drive for high temperatures or corrosive air and gas handling. Designed for bolting in any duct run at any point or at either end. Sizes 16 to 36 in. fans.

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Applications for enrollment should be submitted to the School of Public Health. The fee is $5.00 and a limited number of rooms are available at the Michigan Union.

American Society for Testing Materials, 1916 Race St., Philadelphia 3—Committee week and spring meeting, Hotel William Penn, Pittsburgh, February 27 to March 3.

The 53rd annual meeting and 9th Exhibit of Testing Apparatus and Related Equipment will be held June 26 to 30, Chalfonte-Haddon Hall, Atlantic City.

National Association of Corrosion Engineers, 919 Milam Bldg., Houston 2—The 6th annual conference, St. Louis, April 4 to 7. Symposia under consideration include round table discussions on general corrosion problems and corrosion in connection with pipe lines, refrigeration and air conditioning, and the food industry.

The 12th Annual Midwest Power Conference—To be held April 5 to 7, Sherman Hotel, Chicago. The affair is sponsored by Illinois Institute of Technology, 3300 S. Federal St., Chicago 16, with the cooperation of 18 midwestern universities and professional societies. Dr. E. R. Whitehead, director of electrical engineering at Illinois Tech is conference secretary.

National Oil Heat Exposition, sponsored by the Oil-Heat Instiute of America, Inc., 6 E. 39th St., New York 16.—The affair will be held in conjunction with the 27th annual meeting of OHI, the week of April 24, Commercial Museum, Philadelphia.

Sheet Metal Contractors Association of Illinois—Annual meeting and exhibit, State Armory Bldg., Springfield, Ill., April 27 to 29. George L. Folkers, 709 S. Adams St., Peoria 2, Ill., is convention exhibit chairman.

Heating, Piping, and Air Conditioning Contractors National Association, 1250 Avenue of the Americas, New York 20—1950 annual meeting, May 8 to 12, St. Francis hotel, San Francisco.

National District Heating Association, 827 N. Euclid Ave., Pittsburgh 6—The 41st annual meeting, Grove Park Inn, Asheville, N. C., May 23 to 26.

The Hotel Statler, Detroit, has been selected for the Society's 1951 annual meeting.

Canadian International Trade Fair—To be held May 29 to June 9, Exhibition Grounds, Toronto, Canada.

First United States International Trade Fair—To be held August 7 to 19, Chicago. Exhibits will be classified under 29 categories, including both industrial and consumer commodities. Fair headquarters is in the Merchandise Mart, Chicago 54.

Instrument Conference and Exhibit—Sponsored by the Instrument Society of America, 921 Ridge Ave., Pittsburgh 12, the 1950 Instrument Conference and Exhibit will be held in the War Memorial Auditorium, Buffalo, N. Y., from September 18 to 22. This will be the fifth national conference and exhibit of the Society.

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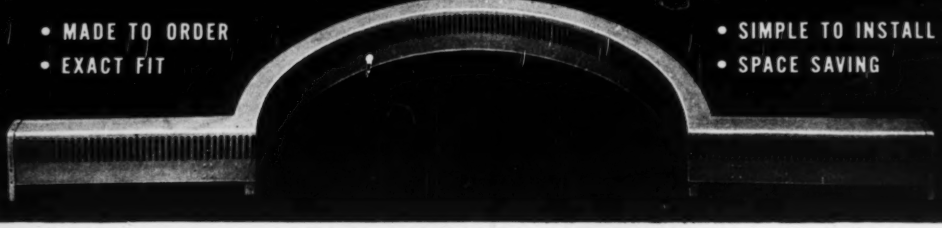

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FOR HEATING and AIR CONDITIONING...

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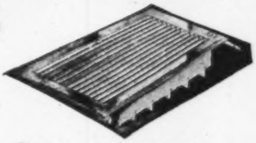

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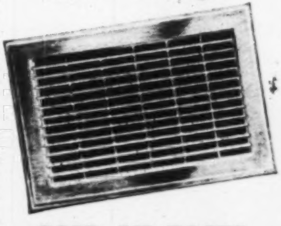

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Has single damper; 3/16" turned down edge for flush installation.

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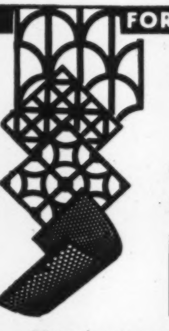

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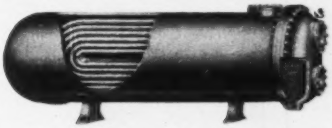
WHITLOCK

HEATING AND COOLING *Equipment*

✓ INSTANTANEOUS HEATERS

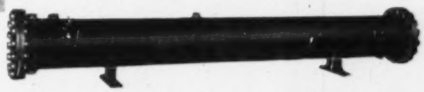


For use where hot water at a nearly uniform rate is desired. Type R shown has a removable U-tube bundle; other designs are available. Write for Bulletin 20.

✓ STORAGE HEATERS

Type K Storage heaters supply ample hot water at all times. Whitlock-Everdur construction assures lifetime service: Also made in Eterno and Standard Steel. See Bulletin 40.

✓ FUEL OIL HEATERS



Preheating promotes efficient atomization and burning. Type V-1 Heater shown is easily cleaned without breaking line connections. Whitlock heaters are made in a wide range of types and sizes. Ask for Bulletin 35.

✓ WATER CHILLERS

For Air Conditioning service Whitlock chillers are built to meet specific job requirements. The dry expansion cooler illustrated is of U-bend design; refrigerant passes through the tubes and cools water in shell —thus less refrigerant is required and danger of freeze-ups is greatly reduced. Ask for recommendations. Whitlock Engineering Service is complete — Bring your heating or cooling problems to us.

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RECENT TRADE LITERATURE

For your convenience in obtaining copies of these bulletins, see coupon on page 253. If you write direct to the manufacturer, describe carefully what literature you want, as the number given first in each item is for use only when sending requests to Heating, Piping & Air Conditioning.

HPAC 7497—AIR CONDITIONING COILS—Engineering data, largely in the form of charts or curves, on the selection of air conditioning coils are given in an eight page bulletin of Refrigeration Economics Co., Inc., Canton 2, Ohio. Information is given on selecting coils for heating or cooling with water, direct expansion coils, and steam blast coils.

HPAC 7498—ALUMINUM INSULATION—The new edition of its Simplified Physics of Thermal Insulation has been expanded to 44 pages by Infra Insulation, Inc., 10 Murray St., New York 7. Information is given on heat transfer, vapor and vapor flow, condensation, radiant heating, and other topics pertinent to the subject of insulation. Data are given on *k*, *C*, *R*, and *U* factors, densities, and thicknesses of numerous insulating materials, including the firm's accordion type aluminum insulation.

HPAC 7499—BASEBOARD HEATING UNITS—Kritzer Radiant Coils, Inc., 2901 Lawrence Ave., Chicago 25, has released a booklet on its line of baseboard heating units. The standard "radiant" baseboard unit incorporates a finned coil, a back cover plate, a front cover plate, and hangers. The deluxe unit features integral fin construction of the coil, the fins being the front of the unit. A curved grille is located between the fins and the horizontal top of the back plate.

HPAC 7500—BIMETAL STRIP THERMOSTATS—A new bulletin describing type R bimetal strip thermostats for use in appliances, industrial equipment, and electronic equipment has been issued by Stevens Mfg. Co., Inc., Mansfield, Ohio. Illustrations include a schematic diagram of the operating principle, a cutaway view of a unit, and a photograph of various standard designs.

HPAC 7501—BLOWERS AND EXHAUSTERS—In addition to covering design and construction features, Bulletin 3014-C of Buffalo Forge Co., Buffalo 5, includes performance curves, capacity tables, and dimensions of electric blowers and exhausters, types E and RE. The variable speed type is made in two sizes only. Constant speed blowers and exhausters are made in 12 sizes with capacities up to 5500 cfm and for pressures up to 1¾ lb.

HPAC 7502—CLUTCH WITH V BELT SHEAVE—The type SF disc clutch of Edgemont Machine Co., Dayton, Ohio, has a gear tooth drive clutch mechanism. The company has standardized on Worthington Pump and Machinery Corp's. QD sheave rims for v belt applications in A, B, C, and D sections where a clutch is desirable. Edgemont Bulletin SF-5 gives detailed information.

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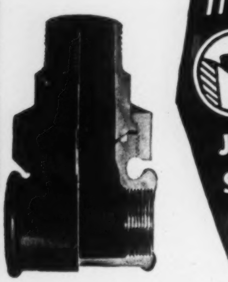

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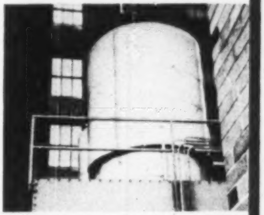

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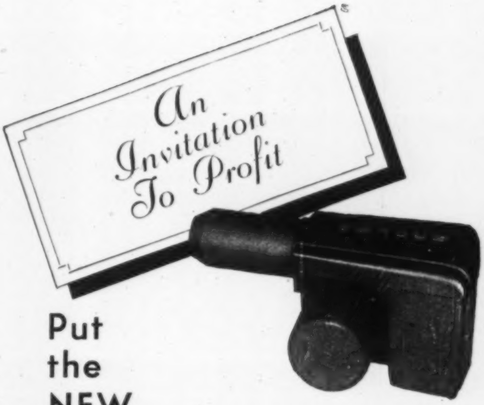

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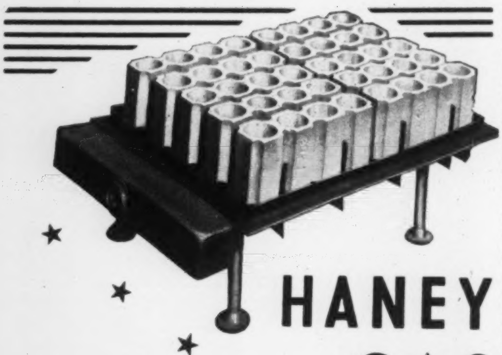

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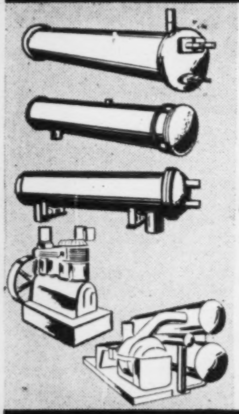

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HPAC 7503—CONVECTORS, UNIT HEATERS—How the huge Caterpillar Tractor Co. plant at Peoria, Ill., is heated with approximately 600 unit heaters and over 200 heating coils is briefly told in the Vol. 13, No. 1 issue of the house organ published by Modine Mfg. Co., Heating and Air Conditioning Div., Racine, Wis. Also featured is a description of how the firm's type F convector (when recessed) makes possible a permanent bond between the enclosure top and sides and the adjoining wall surface.

HPAC 7504—COOLING TOWERS—The ninth in a series of quiz sheets, prepared by Marley Co., Inc., Fairfax and Marley Rds., Kansas City 15, Kans., deals with the treatment of water used in cooling towers. Answers are given to 10 questions dealing with pertinent factors such as pH values, blow-down, corrosion, scaling, slime, and algae.

HPAC 7505—DIRECT FIRED AIR HEATERS—Tabulated data for computing heat loss and figuring heat requirements are contained in a booklet prepared by Thermobloc Div., Prat-Daniel Corp., East Port Chester, Conn. Designated Data File 901-13, it contains tables on outdoor design temperatures, common types of industrial construction, heat losses through window and door infiltration, and a table on heating constants. Included are complete catalog descriptions of the company's self contained, direct fired industrial air heaters of 300,000 and 550,000 Btu per hr capacity. Also available from the manufacturer is a series of data sheets showing how units may be used for tempering make-up air, process heating, and other special applications.

HPAC 7506—ELECTRIC UNIT HEATERS—Electromode Corp., 45 Crouch St., Rochester 3, N.Y., has prepared a new bulletin on its all-electric unit heaters. For 50-60 cycle a-c current only, they are offered in various sizes from approximately 1500 to 153,000 Btu per hr. A feature is the cast aluminum "Safety-Grid" heating element. Another new bulletin describes the firm's line of all-electric room heaters.

HPAC 7507—ENGINEERING COMPUTING SERVICE—Telecomputing Corp., 2901 Hollywood Way, Burbank, Calif., is offering to industry an engineering computing service which utilizes atomatic equipment for the solution of tedious or difficult numerical problems. The firm also designs and manufactures research instruments and special equipment for reading, counting, and plotting graphical data. A new 12 page brochure describes the history of the company, its staff, service procedure, and applications.

HPAC 7508—FASTENERS—Advantages and limitations in designing fasteners and component parts for the cold heading process are given in Bulletin No. 2 of Industrial Fastener Sales, Waterville Div., Scovill Mfg. Co., Waterville 48, Conn. Various types of recessed head screws, tapping screws, standard machine screws, and special cold headed parts are illustrated.

HPAC 7509—FASTENING INSULATION—Application Bulletin No. 3 of Stic-Klip Mfg. Co., 50 Regent St., Cambridge 40, Mass., is essentially a data book on the use of the company's mechanical fasteners in connection with

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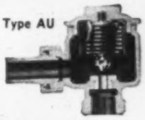
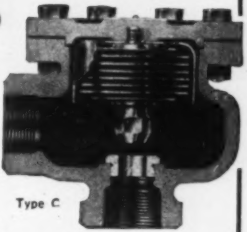
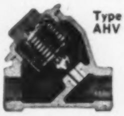




Type C



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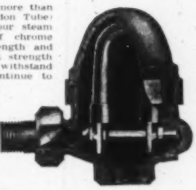

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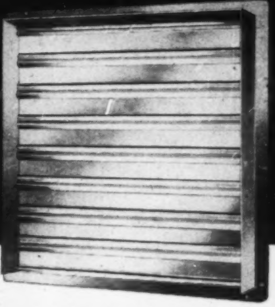

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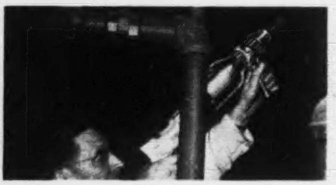

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low temperature insulation. Leading off with a discussion of vapor barriers and insulation finishes, data are given on using fasteners with corkboard and similar materials, glass fiber and mineral wool sheets, etc.

HPAC 7510—GLASS FIBER PRODUCTS—A new 36 page booklet describes and illustrates the facilities and procedures employed by Owens-Corning Fiberglas Corp., Toledo 1, Ohio, in its testing laboratories to provide data on the properties, uses, and performance characteristics of "Fiberglas" materials in various forms. Numerous photographs show laboratory personnel operating the testing facilities.

HPAC 7511—HEATING, AIR CONDITIONING EQUIPMENT—The use of convectors in a new hotel addition, unit air conditioners in an office building, unit heaters in a large service station, and finned radiation in a greenhouse are briefly described, in the form of case histories, in the Vol. 13, No. 8 issue of the house organ published by The Trane Co., La Crosse, Wis. The company's new "Louver Fin" designed for two-dimensional control of the air stream from a horizontal propeller type unit heater is also described.

HPAC 7512—HIGH TEMPERATURE GREASES—The Vol. 35, No. 12 issue of the house organ published by The Texas Co., 135 E. 42nd St., New York 17, gives details on a method of testing high temperature performance of greases. The objective in working out the test procedure was to simulate operating conditions and to correlate laboratory testing with actual field practice when using conventional bearings.

HPAC 7513—HUMIDIFIERS AND TRAPS—The Vol. 18, No. 6 issue of the house organ of Armstrong Machine Works, Three Rivers, Mich., briefly tells how anhydrous ammonia is used as a fertilizer and how it is made. Featured in the article is a discussion of the process cycle and the use of the company's No. 370 purger. Also in the issue is information on the use of the firm's humidifiers in a warehouse for storing television cabinets. Illustrated and described are a number of company products, including a y type pipe strainer and steam traps.

HPAC 7514—HYDRAULIC DRIVES—"Electrofluid" drives of Link-Belt Co., 307 N. Michigan Ave., Chicago 1, are described and illustrated in a new 28 page catalog and engineering data book No. 2385. In effect, the booklet is a progress report on the firm's type ED drive, announced three years ago as a compact, packaged power transmission unit designed to provide smooth, cushioned starting of machines, smooth running under varying conditions of loading, and automatic overload protection. Many applications are given, and sizes up to 30 hp are described.

HPAC 7515—INDUSTRIAL THERMOMETERS—Data on liquid-in-glass industrial thermometers are presented in tabular and sectionalized form in Bulletin E released by Precision Thermometer and Instrument Co., 1506 Brandywine St., Philadelphia 30. All basic models, sizes, forms, and attachments are covered.

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Compared to the *big* features of the Brownell Standard Electric-Welded Steel Boiler, the rear service door looks like a minor item. But firemen always comment on it. They say it's mighty handy for cleaning the fire tubes and rolling in new ones when eventually needed.

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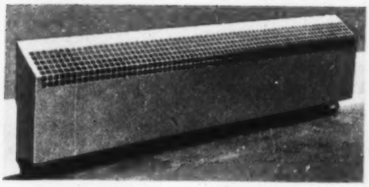

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HPAC 7516—INDUSTRIAL TIMERS—A four page booklet of Zenith Electric Co., 152 W. Walton St., Chicago 10, describes industrial timers and gives applications, specifications, and prices. The new model RT impulse timer is designed for continuous repeat of impulse signals or to operate on and off in equal periods of time. Also covered are interval timers, process timers, a multiple circuit timer.

HPAC 7517—INSTRUMENT VALVES—Information on drop forged steel instrument valves for meter, gage, instrument, and other small lines has been issued by Edward Valves Inc., East Chicago, Ind. These new valves have a rating of 6000 psi WOG at 100 F or 1500 psi steam at 850 F with carbon steel bodies and 1500 psi steam at 1000 F with stainless steel bodies. Bulletin 491 contains dimensions, weights, prices, and operating data.

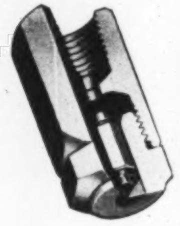
HPAC 7518—INSULATION FASTENERS—Devices for mechanically attaching insulations and other materials to a variety of surfaces, both structural and mechanical, are described and illustrated in a new general catalog of Stic-Klip Mfg. Co., 50 Regent St., Cambridge 40, Mass. In addition to covering various fasteners, accessories, and adhesives, the booklet lists numerous applications, including insulation of boiler room walls and ceilings, air ducts, washers, plenum chambers, heater casings, tanks, etc.

HPAC 7519—NICKEL ALLOYS—The new ductile cast iron developed by International Nickel Co., Inc., New York 5., is featured in the leadoff article of the Vol. 2, No. 11 issue of the company's house organ. Properties and applications are discussed. Also described in other articles are several types of pumps incorporating nickel alloy parts.

HPAC 7520—ONE PIPE, HOT WATER FITTINGS—Pertinent data on both cast iron and copper fittings for the "Monoflo" one pipe system of forced hot water heating are contained in a six page bulletin (CL-949) of Bell & Gossett Co., Morton Grove, Ill. In addition to describing advantages, the booklet shows how to use fittings in various types of installations and gives simplified rules for designing the system.

HPAC 7521—PIPELINE STRAINERS—Bulletin S-202 of Yarnall-Waring Co., Mermaid Lane, Philadelphia 18, is a revised publication on "Yarway" pipeline strainers. New pressure and screen data tables are featured. Screens for screwed-end strainers, sizes ½ to 2 in., are made of Dutch weave monel wire filter cloth. Screens for flanged units are made of perforated brass, monel, or other metal with perforations of various diameters.

HPAC 7522—PREFINISHED METALS—A data folder has been issued by American Nickeloid Co., Peru, Ill., on characteristics of its prefinished metals. Properties, tempers, and finishes are described for brass, zinc, aluminum, copper, and steel base metals. Bright and satin finishes are offered in striped, crimped, and corrugated patterns. Also included is information on sizes of sheets, coils, and strips available.



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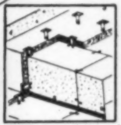

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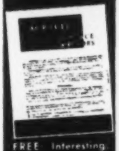

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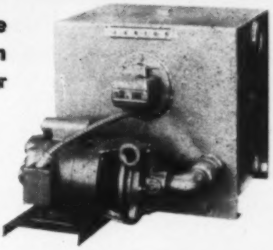

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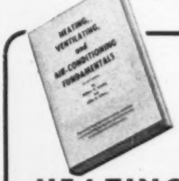

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HPAC 7523—SHADED POLE MOTORS—Ratings and constructional features of the recently introduced type 350, two pole, skeleton frame, shaded pole induction motors are given in Bulletin 2000 of Russell Electric Co., Div. of Raytheon Mfg. Co., 4501 S. Western Blvd., Chicago 9. Running at approximately 3000 rpm, motors have ratings of 1/10 and 1/15 hp. Additional ratings of 1/6 and 1/40 hp will soon be available. Another bulletin (No. 1000) covers the similar type 230 motor offered in ratings from 1/50 to 1/200 hp at 3000 rpm.

HPAC 7524—SOLDERING TOOLS—The complete line of soldering products of P. Wall Mfg. Co., 312 Erie St., Grove City, Pa., and its new division, Harmic Mfg. Co., is described in Catalog 85. Products include gasoline and kerosene blow torches, self generating alcohol blow torches, electric soldering irons, solder, compound kettles, oilers, grease buckets, and shop torches.

HPAC 7525—SQUARE AIR DIFFUSER—Bulletin 29 explains the performance and application of the new square type E aspirating air diffuser of Anemostat Corp. of America, 10 E. 39th St., New York 16. In addition to giving neck velocity and capacity values, as well as dimensions, the booklet describes units for flush mounting on acoustic tile ceilings, the model E-1 with a flange for regular ceiling installation, and a snap-on diffuser and equalizer assembly.

HPAC 7526—STATIONARY EXHAUSTER—The "Air-X-Hauster" of G. C. Breidert Co., 3129 San Fernando Rd., Los Angeles 65, is described and illustrated in a new eight page catalog. Dimensions and materials of construction are tabulated for these units which may be used as roof ventilators, vent flue caps, and chimney tops. In addition to describing the operating principle, the booklet features case histories and testimonial letters.

HPAC 7527—STEAM OR WATER BOILER—A new heating unit, designed to generate 15 psi steam or to heat water or other fluids at pressures up to 40 psi, is described in an eight page bulletin released by Black, Sivalls & Bryson, Inc., 720 Delaware, Kansas City 6, Mo. Designed primarily for smaller industrial requirements such as in cleaning establishments and small factories, it is also said to be suitable for heating commercial buildings, apartments, schools, swimming pools, etc. Capacities, recommended hookups, and specifications are given.

HPAC 7528—STEEL BOILER—Features, specifications, dimensions, and a detailed description of its series 400 steel boilers are contained in a booklet released by Fitzgibbons Boiler Co., Inc., 101 Park Ave., New York 17. The boiler is designed for small building applications.

HPAC 7529—TANK HEATING, COOLING—"Platecoils" consist of embossed metal sheets of 16 ga metal, seam and spot welded to form units through which is circulated, under pressure, heating or cooling media. They are described and illustrated in a new six page bulletin of Kold-Hold Mfg. Co., Lansing 4, Mich. Materials of construction, selection tables, specifications, and advantages are given.

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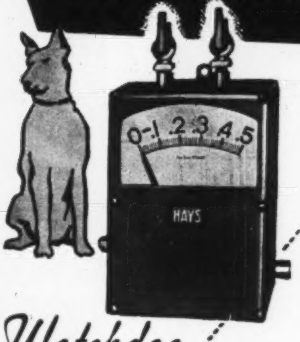

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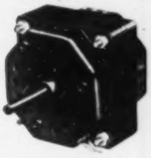

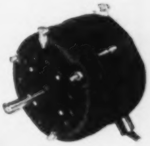

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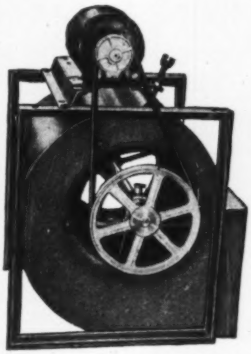

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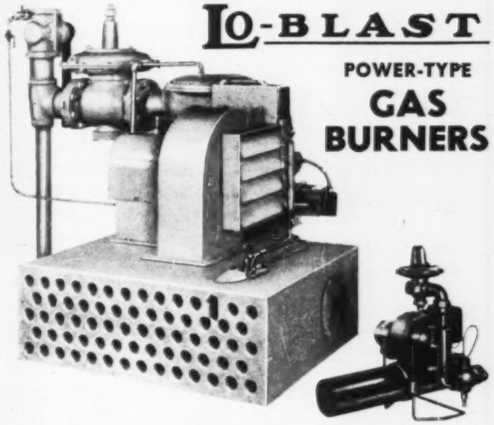

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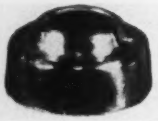

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HPAC 7530—TIMING MOTORS—International Register Co., 2616 W. Washington Blvd., Chicago 12, is now producing series SC and LC self starting, synchronous timing motors. These units are designed specifically for use with many time controlled products, such as time switches, interval timers, flow meters, electric clocks, electric counters, etc. Offered for general use by other manufacturers, they are covered in a new four page bulletin.

HPAC 7531—VALVE PLUGS—Bulletin 645 of Duriron Co., Inc., Toledo 1, Ohio, covers plugs for "Durco" plug valves. Designed for corrosion resisting service, they include flexible jointed units, one piece plugs offered in hardenable alloys, composite units having stainless steel shanks and special corrosion resisting plugs, and a high silicon iron design.

HPAC 7532—VENTURI TYPE BALL VALVES—Bulletin 103, released by Paul Valve Corp., 683 Third Ave., New York 17, covers venturi ball valves. Included are engineering data on bar stock valves, cast steel, stainless steel, and forged valves. Methods of operation described consist of a standard handwheel, quick-opening lever, diaphragm, piston and cylinder, solenoid, and emergency trip mechanism.

HPAC 7533—WELDING RODS, ELECTRODES—Featuring 65 "Eutecrods" for torch welding and "Eutectrodes" for arc welding, the 1950 directory of low temperature welding products of Eutectic Welding Alloys Corp., 40 Worth St., New York 13, contains numerous case histories. Among products listed is a new line of "Eutec-Staintrodes" for stainless steel arc welding and a new "Eutec-Stainrod" for gas welding stainless steel. A complete selection chart is included.

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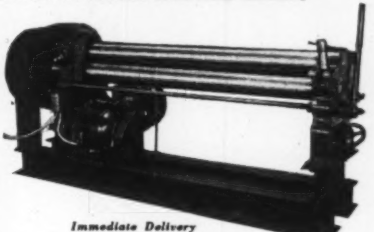

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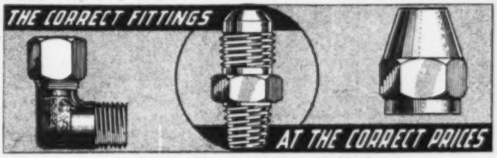

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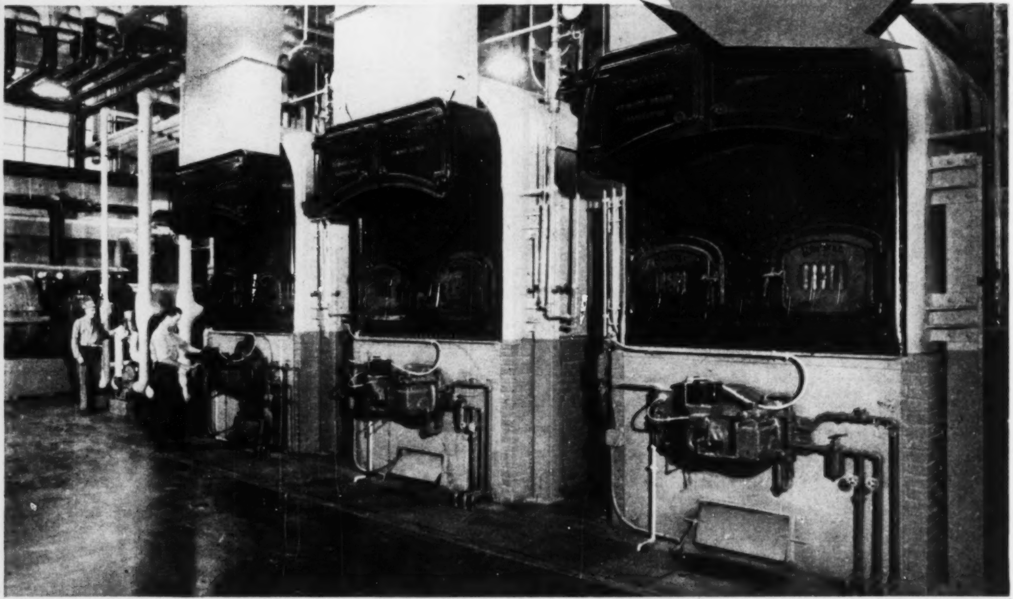

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INDUSTRIAL, COMMERCIAL, INSTITUTIONAL AND PUBLIC BUILDINGS

PART 1—PRODUCTS CLASSIFIED—PAGE 2d

If you want to know the names of one or more manufacturers making a certain product, look in Part 1, where products are classified alphabetically in "directory style" with the noun governing (for instance, "unit heaters" are listed under "heaters, unit").

PART 2—TRADE NAMES—Page 90d

If you have the trade name of a product and want to know who manufactures it, look in Part 2, where trade names are alphabetically listed. Trade names the same as or identifiable from the company name are not listed. Manufacturers with such trade names can be easily identified under their product classification in Part 1.

PART 3—MANUFACTURERS' ADDRESSES—PAGE 104d

For the complete name and address of any manufacturer look in Part 3.

● The manufacturers whose names are spotted throughout the listings advertise in this issue. See Index to Advertisers (on page 120d) for the page on which you will find the advertising of any of these manufacturers.

Heating, Piping & Air Conditioning
6 N. Michigan Ave.
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HEATING, PIPING, AND AIR CONDITIONING EQUIPMENT FOR INDUSTRY AND LARGE BUILDINGS

PART 1—PRODUCTS CLASSIFIED

ABSORBERS, VIBRATION

See Hose, Metal and Fittings; Bases and Pads, Vibration Isolating

ABSORBERS, VIBRATION, FOR REFRIGERANT LINES

American Metal Hose Branch, The American Brass Co., Waterbury, Conn.
Atlantic Metal Hose Co., Inc., New York, N. Y.
● Bendix Aviation Corp., Eclipse—Pioneer Div., Teterboro, N. J.
Chicago Metal Hose Corp., Maywood, Ill.
Finn & Co., New York, N. Y.
Firestone Industrial Products, Akron, O.
Packless Metal Products Corp., New Rochelle, N. Y.
Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.
Pleasantaire Corp., Washington, D. C.
Resistoflex Corp., Belleville, N. J.
Seamlex Co., Inc., Long Island City, N. Y.
Titeflex, Inc., Newark, N. J.
United Metal Hose Co., Inc., Long Island City, N. Y.
Wade Mfg. Co., Elgin, Ill.

ABSORPTION DEHUMIDIFIERS

See Dehumidifiers, Absorption and Adsorption

ABSORPTION REFRIGERATION MACHINES

See Machines, Refrigeration, Absorption

ACCUMULATORS, REFRIGERATION (FOR AIR CONDITIONING)

● **Acme Industries, Inc., Jackson, Mich.**
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
● Doyle and Roth Mfg. Co., Brooklyn, N. Y.
● **Frick Co., Waynesboro, Pa.**
● Henry Valve Co., Melrose Park, Ill.
McQuay, Inc., Minneapolis, Minn.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Phillips & Co., H. A., Chicago, Ill.
Reco Products Div., Refrigeration Engineering Corp., Philadelphia, Pa.
Richmond Engineering Co., Inc., Richmond, Va.
Roessing Mfg. Co., Pittsburgh, Pa.
Temprite Products Corp., Detroit, Mich.
Vilter Mfg. Co., The., Milwaukee Wis.
Wabash Mfg. Co., Chicago, Ill.
Weatherhead Co., Cleveland, O.
Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
XL Refrigerating Co., Chicago, Ill.

ADHESIVES, FOR PIPE COVERING

Arabol Mfg. Co., New York, N. Y.
● Armstrong Cork Co., Lancaster, Pa.
● Cork Import Corp., Englewood, N. J.
Firestone Industrial Products, Akron, O.
Flintkote Co., The, New York, N. Y.
Foster Co., Benjamin, Philadelphia, Pa.
● Miracle Adhesives Corp., New York, N. Y.
Moore Inc., Goodloe E., Danville, Ill.
Mystik Adhesive Products Div., Chicago Show Printing Co., Chicago, Ill.
Pecora Paint Co., Inc., Philadelphia, Pa.
St. Clair Rubber Co., Detroit, Mich.
Sauereisen Cements Co., Pittsburgh, Pa.
Standard Asbestos Mfg. Co., Chicago, Ill.
Stic-Klip Mfg. Co., Cambridge, Mass.

ADSORBERS, ODOR

Carbide and Carbon Chemicals Corp., Unit of Union Carbide & Carbon Corp., New York, N. Y.
● **Connor Engineering Corp., W. B., New York, N. Y**
Pur Air Div., American Solvent Recovery Corp., Columbus, O.
Refinite Corp., Omaha, Neb.
Tamms Industries, Inc., Chicago, Ill.

ADSORPTION DEHUMIDIFIERS

See Dehumidifiers, Absorption and Adsorption

AFTERCOOLERS, COMPRESSED AIR

Adams Co., Inc., R. P., Buffalo, N. Y.
American Locomotive Co., Alco Products Div., New York, N. Y.
American Moistening Co., Providence, R. I.
Andale Co., Philadelphia, Pa.
Armstrong Co., Richard M., Westchester, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Brown Fintube Co., The, Elyria, O.
Bury Compressor Co., Erie, Pa.
Chicago Pneumatic Tool Co., New York, N. Y.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
● Davis Engineering Corp., Elizabeth, N.J.
Downingtown Iron Works, Downingtown, Pa.
● Doyle and Roth Mfg. Co., Brooklyn, N. Y.
Electric Sprayit Co., The, Sheboygan, Wis.
Goodyer Industries, Inc., Chicago, Ill.
Graham Mfg. Co., Inc., New York, N. Y.
Griscom-Russell Co., The, New York, N. Y.
Halstead & Mitchell, Pittsburgh, Pa.
Howard Iron Works & Alberger Heater Div., Buffalo, N. Y.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Ingersoll-Rand Co., New York, N. Y.
Johnson Corp., The, Three Rivers, Mich.
● **Joy Mfg. Co., Pittsburgh, Pa.**
● **Modine Mfg. Co., Racine, Wis.**
● **Murray Mfg. Co., D. J., Wausau, Wis.**
● Niagara Blower Co., New York, N. Y.
Parks-Cramer Co., Fitchburg, Mass.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Rome-Turney Radiator Co., Rome, N. Y.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Ruemelin Mfg. Co., Milwaukee, Wis.
Schramm, Inc., West Chester, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
Wilson Engineering Corp., Chicago, Ill.
Worthington Pump & Machinery Corp., Harrison, N. J.
● **Young Radiator Co., Racine, Wis.**

AIR AFTERCOOLERS

See Aftercoolers, Compressed Air

AIR BREAK FITTINGS

See Fittings, Drainage, Fixed Air Break

AIR CLEANERS

See Cleaners, Air, Electrical

AIR COMPRESSORS

See Compressors, Air

AIR CONDITIONERS

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AIR CONDITIONING UNITS

See Units, Air Conditioning

AIR DIFFUSERS

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AIR ELIMINATORS

See Eliminators, Air

AIR FILTER CLEANING COMPOUNDS

See Compounds, Cleaning, Air Filter

AIR FILTER GAGES

See Gages, Air Filter

AIR FILTERS

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AIR FRESHENING

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AIR OPERATING VALVES

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AIR VOLUME METERS

See Meters, Volume, Air and Gas

AIR WASHERS

See Washers, Air

ALARMS, HIGH AND LOW BOILER WATER

American District Telegraph Co., New York, N. Y.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Campbell Co., J. A., Long Beach, Calif.
Coral Designs, Forest Hills, N. Y.
Defender Instrument & Regulator Co., St. Louis, Mo.
Diamond Power Specialty Corp., Detroit, Mich.
Dutton Co., C. H., Kalamazoo, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Fischer & Porter Co., Hatboro, Pa.
Johnson Corp., The, Three Rivers, Mich.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Magnetrol, Inc., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Newark Boiler Regulator Co., Inc., Bloomfield, N. J.
Northern Equipment Co., Erie, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Reliance Gauge Column Co., Cleveland, O.
Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
Unit Alarm Co., The, Elizabethton, Tenn.
Wright-Austin Co., Detroit, Mich.
● Yarnall-Waring Co., Philadelphia, Pa.

ALARMS, LIQUID LEVEL, AUDIBLE

American District Telegraph Co., New York, N. Y.
B/W Controller Corp., Birmingham, Mich.
Benjamin Electric Mfg. Co., Des Plaines, Ill.
Boston Auto Gage Co., Pittsfield, Mass.
Bristol Co., The, Waterbury, Conn.
Clark Controller Co., Cleveland, O.
Cutler-Hammer, Inc., Milwaukee, Wis.
Defender Instrument & Regulator Co., St. Louis, Mo.
Newark Boiler Regulator Co., Inc., Bloomfield, N. J.
Reliance Gauge Column Co., Cleveland, O.
Scully Signal Co., Cambridge, Mass.
Uehling Instrument Co., Paterson, N. J.
Unit Alarm Co., The, Elizabethton, Tenn.

ALARMS, SMOKE

American District Telegraph Co., New York, N. Y.
Bailey Meter Co., Cleveland, O.
Boiler Room Equipment Inc., New York, N. Y.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Defender Instrument & Regulator Co., St. Louis, Mo.
Ess Instrument Co., Bergenfield, N. J.
Ess Specialty Corp., Bergenfield, N. J.
Furst Electronics, Chicago, Ill.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
General Power Plant Corp., New York, N. Y.
Instruments Associates, Inc., Brooklyn, N. Y.
Leeds & Northrup Co., Philadelphia, Pa.
McNeill Engineering Co., Chicago, Ill.
Photoswitch, Inc., Cambridge, Mass.
Preferred Utilities Mfg. Corp., New York, N. Y.
Unit Alarm Co., The, Elizabethton, Tenn.
Worner Electronic Devices, Rankin, Ill.

ALGAE CONTROL, WATER TREATMENT FOR SLIME AND

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ALUMINUM COATED SHEETS

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ALUMINUM PIPE

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ALUMINUM SHEETS

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ANALYZERS, CARBON DIOXIDE, PORTABLE

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Barclay, Inc., Robert, Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
Dwyer Mfg. Co., F., W., Chicago, Ill.
Ellison Draft Gage Co., Chicago, Ill.
Engelhard, Inc., Chas., Newark, N. J.
● Hays Corp., Michigan City, Ind.
Hotstream Heater Co., Cleveland, O.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Permutit Co., New York, N. Y.
Preferred Utilities Mfg. Corp., New York, N. Y.
Service to Industry, West Hartford, Conn.
Uehling Instrument Co., Paterson, N. J.

ANEMOMETERS

Barclay, Inc., Robert, Chicago, Ill.
Dietzgen Co., Eugene, Chicago, Ill.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
G. M. Mfg. Co., New York, N. Y.
Hill, E. Vernon & Co., Chicago, Ill.
● Illinois Testing Laboratories, Inc., Chicago, Ill.
● Taylor Instrument Companies, Rochester, N. Y.
Wallace & Tiernan Co., Inc., Newark, N. J.
Wilson Products, Inc., Reading, Pa.

ANGLE VALVES

See Valves, Angle

ANGLES, BARS, BEAMS, CHANNELS AND TEES (LIGHT WEIGHT SHAPES)

Allegheny Ludlum Steel Corp., Pittsburgh, Pa. (Stainless)
Aluminum Co. of America, Pittsburgh, Pa.
American Brass Co., Waterbury, Conn.
Atlantic Steel Co., Atlanta, Ga.
Bethlehem Steel Co., Bethlehem, Pa.
Byers Co., A. M., Pittsburgh, Pa.
● Carnegie-Illinois Steel Corp., United States Steel Corp. Subsidiary, Pittsburgh, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
● Columbia Steel Co., United States Steel Corp., Subsidiary, San Francisco. Calif.
Decatur Iron & Steel Co., Decatur, Ala.
Dow Chemical Co., The, Midland, Mich.
Inland Steel Co., Chicago, Ill.
Inland Steel Products Co., Milwaukee, Wis.
International Steel Co., Evansville, Ind.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Laclede Steel Co., St. Louis, Mo.
Lees, John, Div., The, Serrick Corp., Muncie, Ind.
Mesker Steel Corp., Geo. L., Evansville, Ind.
Republic Steel Corp., Cleveland, O.
● Revere Copper and Brass, Incorporated, New York, N. Y.
Reynolds Metals Co., Louisville, Ky.
● Tennessee Coal, Iron & Railroad Co., United States Steel Corp. Subsidiary, Birmingham, Ala.
Truscon Steel Co., Youngstown, O.
Weirton Steel Co., Weirton, W. Va.
● Youngstown Sheet & Tube Co., Youngstown, O.

AQUASTATS

See Thermostats

ARC WELDERS

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ARC WELDING ELECTRODES

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ASBESTOS FIBER AND CEMENT PIPE

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ASBESTOS PACKING

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ASH CONVEYORS

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ATOMIZING NOZZLES

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AXIAL FLOW FANS

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BALANCING ELBOWS FOR HOT WATER HEATING SYSTEMS

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BAROMETRIC CONTROLS
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BASEBOARD RADIATION
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BASES, MOTOR, TENSION ADJUSTING
Ackermann Mfg. Co., Wheeling, W. Va.
Alexander Bros., Philadelphia, Pa.
● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia, Pa.
Electrovent Fan & Mfg. Co., Chicago, Ill.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Rhoads & Sons, J. E., Philadelphia, Pa.
Rockwood Mfg. Co., Inc., Indianapolis, Ind.
Schnacke, Inc., Evansville, Ind.
Valley Foundry & Machine Works, Inc., Fresno, Calif.

BASES AND PADS, VIBRATION ISOLATING
● Buffalo Forge Co., Buffalo, N. Y.
Chicago Die Casting Mfg. Co., Chicago, Ill.
● Clarage Fan Co., Kalamazoo, Mich.
● Cork Import Corp., Englewood, N. J.
Cork Insulation Co., Inc., New York, N. Y.
Felters Company, The, Boston, Mass.
Finn & Co., New York, N. Y.
Firestone Industrial Products, Akron, O.
Gates Rubber Co., Denver, Colo.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Hobsite Products Co., Paterson, N. J.
Johns-Manville, New York, N. Y.
Korfund Co., Inc., Long Island City, N. Y.
Lord Mfg. Co., Erie, Pa.
M B Mfg. Co., Inc., The, New Haven, Conn.
● Mundet Cork Corp., North Bergen, N. J.
National Lead Co., New York, N. Y.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Raybestos-Manhattan, Inc., Passaic, N. J.
Robinson Aviation, Inc., Vibrashock Div., Teterboro, N. J.
Sponge Rubber Products Co., Shelton, Conn.
United Cork Companies, Kearny, N. J.
United States Rubber Co., New York, N. Y.
Vibration Eliminator Co., Long Island City, N. Y.
Western Felt Works, Chicago, Ill.

BEARINGS, BALL
Ahlberg Bearing Co., Chicago, Ill.
Bearings Co. of America, Lancaster, Pa.
● Dodge Mfg. Corp., Mishawaka, Ind.
Fafnir Bearing Co., New Britain, Conn.
Landis & Gyr Inc., New York, N. Y.
Link-Belt Co., Indianapolis, Ind.
Marlin-Rockwell Corp., Jamestown, N. Y.
New Departure Div., General Motors Corp., Bristol, Conn.
Nice Ball Bearing Co., Philadelphia, Pa.
Norma-Hoffman Bearings Corp., Stamford, Conn.
● SKF Industries, Inc., Philadelphia, Pa.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
● Stephens-Adamson Mfg. Co., Aurora, Ill.
Thomson Industries, Inc., Manhasset, N. Y.
Torrington Co., The, Bantam Bearings Div., South Bend, Ind.
Wood's Sons Co., T. B., Chambersburg, Pa.

BEARINGS, NEEDLE
Roller Bearing Co. of America, Trenton, N. J.
Torrington Co., The, Bantam Bearings Div., South Bend, Ind.

BEARINGS, PILLOW BLOCK
Ahlberg Bearing Co., Chicago, Ill.
Anti-Friction Bearings Co., Los Angeles, Calif.
Caldwell Co., W. E., Louisville, Ky.
Central Die Casting & Mfg. Co., Inc., Chicago, Ill.
Chain Belt Co., Milwaukee, Wis.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Clizbe Bros. Mfg. Co., Plymouth, Ind.
Congress Drives Div., Detroit, Mich.
Dick Co., Inc., R. & J., Passaic, N. J.
● Dodge Mfg. Corp., Mishawaka, Ind.
Fafnir Bearing Co., New Britain, Conn.
Freed Products Co., Moline, Ill.
Goldens' Foundry & Machine Co., Columbus, Ga.
Jeffrey Mfg. Co., Columbus, O.
Jones Foundry & Machine Co., W. A., Chicago, Ill.
Lau Blower Co., Dayton, O.
Link-Belt Co., Indianapolis, Ind.
Medart Co., St. Louis, Mo.
Moraine Products Div., General Motors Corp., Dayton, O.
Norma-Hoffman Bearings Corp., Stamford, Conn.
● Randall Graphite Bearings, Inc., Chicago, Ill.
Royersford Foundry & Machine Co., Inc., Royersford, Pa.
● SKF Industries, Inc., Philadelphia, Pa.
Shafer Bearing Corp., Downers Grove, Ill.
Sprout, Waldron & Co., Muncy, Pa.
Standard Pressed Steel Co., Jenkintown, Pa.
● Stephens-Adamson Mfg. Co., Aurora, Ill.
Torrington Co., The, Bantam Bearings Div., South Bend, Ind.
Triangle Mfg. Co., Oshkosh, Wis.
Webb Co., The, Webb City, Mo.
Whiteley Bearing Corp., Chicago, Ill.
Wood's Sons Co., T. B., Chambersburg, Pa.

BEARINGS, ROLLER
Ahlberg Bearing Co., Chicago, Ill.
● Dodge Mfg. Corp., Mishawaka, Ind.
Hyatt Bearings Div., General Motors Corp., Harrison, N. J.
Link-Belt Co., Indianapolis, Ind.
Medart Co., St. Louis, Mo.
Norma-Hoffman Bearings Corp., Stamford, Conn.
Roller Bearing Co. of America, Trenton, N. J.
Royersford Foundry & Machine Co., Inc., Royersford, Pa.
● SKF Industries, Inc., Philadelphia, Pa.
Shafer Bearing Corp., Downers Grove, Ill. (self aligning)
Timken Roller Bearing Co., Canton, O.
Torrington Co., The, Bantam Bearings Div., South Bend, Ind.
Wood's Sons Co., T. B., Chambersburg, Pa.

BEARINGS, SLEEVE
Cleveland Graphite Bronze Co., Cleveland, O.
● Dodge Mfg. Corp., Mishawaka, Ind.
Federal-Mogul Corp., Detroit, Mich.
Green Fuel Economizer Co., Beacon, N. Y.
International Powder Metallurgy, Inc., Ridgway, Pa.
Johnson Bronze Co., New Castle, Pa.
Keystone Carbon Co., Inc., St. Marys, Pa.
Medart Co., St. Louis, Mo.
Moraine Products Div., General Motors Corp., Dayton, O.
● Randall Graphite Bearings, Inc., Chicago, Ill.
Whiteley Bearing Corp., Chicago, Ill.
Wood's Sons Co., T. B., Chambersburg, Pa.

BELLOWS, THERMOSTATIC AND METALLIC
● Bishop & Babcock Mfg. Co., Cleveland, O.
Bridgeport Thermostat Div., Robertshaw-Fulton Controls Co., Bridgeport, Conn.
Chicago Metal Hose Corp., Maywood, Ill.
Clifford Mfg. Co., Div. of Standard-Thomson Corp., Waltham, Mass.
Cook Electric Co., Diaphlex Div., Chicago, Ill.
● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
MagniLastic Div., Cook Electric Co., Chicago, Ill.
● Sterling, Inc., Milwaukee, Wis.
● Zallea Bros., Wilmington, Del.

BELTING, FLAT, LEATHER
Alexander Bros., Philadelphia, Pa.
Baldwin Belting, Inc., New York, N. Y.
Chicago Belting Co., Chicago, Ill.
Graton & Knight Co., Worcester, Mass.
Houghton & Co., E. F., Philadelphia, Pa.
Rhoads & Sons, J. E., Philadelphia, Pa.
Schieren Co., Chas. A., New York, N. Y.
Williams & Son, I. B., Dover, N. H.

BELTING, FLAT, RUBBER
Boston Woven Hose & Rubber Co., Cambridge, Mass.
Dick Co., Inc., R. & J., Passaic, N. J.
Garlock Packing Co., Palmyra, N. Y.
Gilmer Co., L. H., Div. of United States Rubber Co., Philadelphia, Pa.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Hamilton Rubber Mfg. Corp., Trenton, N. J.
Manheim Mfg. & Belting Co., Manheim, Pa.
Quaker Rubber Corp., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J.
Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, O.
Thermoid Co., Trenton, N. J.
United States Rubber Co., New York, N. Y.

BELTS, V
● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia, Pa.
Baldwin Belting, Inc., New York, N. Y.

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Boston Woven Hose & Rubber Co., Cambridge, Mass.
Browning Mfg. Co., Inc., Maysville, Ky.
Chicago Belting Co., Chicago, Ill.
Continental Rubber Wks., Erie, Pa.
● Dayton Rubber Co., Dayton, O.
Dick Co., Inc., R. & J., Passaic, N. J.
● Dodge Mfg. Corp., Mishawaka, Ind.
Gates Rubber Co., Denver, Colo.
Gilmer Co., L. H., Div. of United States Rubber Co., Philadelphia, Pa.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Jones Foundry & Machine Co., W. A., Chicago, Ill.
Manheim Mfg. & Belting Co., Manheim, Pa.
Maurey Mfg. Corp., Chicago, Ill.
Medart Co., St. Louis, Mo.
Pyott Foundry & Machine Co., Chicago, Ill.
Quaker Rubber Corp., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J.
Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, O.
Rhoads & Sons, J. E., Philadelphia, Pa.
Rockwood Mfg. Co., Inc., Indianapolis, Ind.
Schieren Co., Chas. A., New York, N. Y.
Thermoid Co., Trenton, N. J.
United States Rubber Co., New York, N. Y.
Wood's Sons Co., T. B., Chambersburg, Pa.
Worthington Pump & Machinery Corp., Harrison, N. J.

BENDERS, PIPE

Air Reduction Sales Co., New York, N. Y.
American Pipe Bending Machine Co., Inc., Poultney, Vt.
American Pipe Tool Co., Chicago, Ill.
Blackhawk Mfg. Co., Milwaukee, Wis.
● Buffalo Forge Co., Buffalo, N. Y.
Crown Die & Tool Co., Chicago, Ill. (Hand)
Electric Cord Co., New York, N. Y.
● Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill.
Holsclaw Bros., Inc., Evansville, Ind.
Hossfeld Mfg. Co., Winona, Minn.
O'Neil Irwin Mfg. Co., Lake City, Minn.
Pedrick Tool & Machine Co., Philadelphia, Pa.
Pines Engineering Co., Inc., Aurora, Ill.
Radiant Devices, St. Louis, Mo.
Sac Tool Mfg. Co., St. Louis, Mo.
Tal Bender, Inc., Milwaukee, Wis.
Vanderman Mfg. Co., Willimantic, Conn.
Wallace Supplies Mfg. Co., Chicago, Ill.
● Watson-Stillman Co., Roselle, N. J.

BENDERS, TUBING

American Pipe Bending Machine Co., Inc., Poultney, Vt.
Armstrong Mfg. Co., Bridgeport, Conn.
Bernz Co., Otto, Rochester, N. Y.
● Buffalo Forge Co., Buffalo, N. Y.
Everhot Products Co., Chicago, Ill.
● Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill.
Griffith Equipment Co., Inc., Los Angeles, Calif.
Holsclaw Bros., Inc., Evansville, Ind.
Hossfeld Mfg. Co., Winona, Minn.
Imperial Brass Mfg. Co., Chicago, Ill.
Keeney Mfg. Co., Newington, Conn.
Leonard Precision Products Co., Garden Grove, Calif.
O'Neil Irwin Mfg. Co., Lake City, Minn.
Parker Appliance Co., The, Cleveland, O.
Pedrick Tool & Machine Co., Philadelphia, Pa.
Pines Engineering Co., Inc., Aurora, Ill.
Republic Steel Corp., Steel and Tubes Div., Cleveland, O.
Sac Tool Mfg. Co., St. Louis, Mo.
Steel City Electric Co., Pittsburgh, Pa.
Tal Bender, Inc., Milwaukee, Wis.
Wallace Supplies Mfg. Co., Chicago, Ill.

BENDS, EXPANSION, STEAM PIPE

American Locomotive Co., Alco Products Div., New York, N. Y.
Clow & Sons, James B., Chicago, Ill.
● Crane Co., Chicago, Ill.
Ellsworth Pipe & Supply Co., Milwaukee, Wis.
Flori Pipe Co., The, St. Louis, Mo.
● Grinnell Co., Inc., Providence, R. I.
Harris & Co., Arthur, Chicago, Ill. (Stainless & non-ferrous)
Kellogg Co., M. W., The, New York, N. Y. (Corrugated steel)
Lumsden & Van Stone Co., Div. of Midwest Piping & Supply Co., South Boston, Mass.
● Midwest Piping & Supply Co., Inc., St. Louis, Mo.
Mitchell & Co., Inc., W. K., Philadelphia, Pa.
National Valve & Mfg. Co., Pittsburgh, Pa.
Ohio Pipe Bending & Machine Co., Cleveland, O.
Parks-Cramer Co., Fitchburg, Mass.
Pittsburgh Pipe Coil & Bending Co., Etna, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Power Piping Div., Blaw-Knox Co., Pittsburgh, Pa.
● Rempe Co., Chicago, Ill.
● Ric-wiL Co., Cleveland, O.
Roessing Mfg. Co., Pittsburgh, Pa.
Sales & Co., Murray W., Detroit, Mich.
Shaw Co., Benjamin F., Wilmington, Del.
Shaw-Kendall Engineering Co., Toledo, O.
U. S. Pipe & Mfg. Co., San Francisco, Calif.
● Walworth Co., New York, N. Y.
Western Piping & Engineering Co., San Francisco, Calif.
● Whitlock Mfg. Co., Hartford, Conn.

BI-METALS, THERMOSTATIC

Baker & Co., Inc., Newark, N. J.
Chace Co., W. M., Detroit, Mich.
General Plate Div., Metals & Controls Corp., Attleboro, Mass.
● Westinghouse Electric Corp., Pittsburgh, Pa.
Wilson Co., H. A., The, Newark, N. J.

BLADES, PROPELLER FAN

Ackermann Mfg. Co., Wheeling, W. Va.
Aerovent Fan Co., Inc., Piqua, O.
Aire-Foile Fan & Blower Co., Detroit, Mich.
Airmaster Corp., Chicago, Ill.
● Alliance Mfg. Co., Alliance, O.
Beckett & Co., Inc., Thomas, Dallas, Tex.
Bronson Mfg. Co., Los Angeles, Calif.
Burden Div., Torrington Mfg. Co., Los Angeles, Calif.
C & H Air Conditioning Fan Co., Inc., Atlanta, Ga.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., Inc., Irvington, N. J.
Circulators & Devices Mfg. Corp., New York, N. Y.
● DeBothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Dual-Air Fan Co., South Elgin, Ill.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Gates Engineering Co., Wilmington, Del.
Goettl Bros. Metal Prod. Inc., Phoenix, Ariz.
International Engrg. Inc., Dayton, O.
● Joy Mfg. Co., Pittsburgh, Pa.
Martin Fan & Blower Co., Chicago, Ill.
Meier Electric & Machine Co., Inc., Indianapolis, Ind.
Motionair Co., Los Angeles, Calif.
Myers Electric Co., Inc., Pittsburgh, Pa.
Norwin Co., Freeport, Ill.
Panelyte Div., St. Regis Paper Co., New York, N. Y.
Peerless Electric Co., Warren, O.
● Propellair Div., Robbins & Meyers Inc., Springfield, O.
Roto-Beam, Chicago, Ill.
Schwitzer-Cummins Co., Indianapolis, Ind.
Sensenich Corp., Lancaster, Pa.
● South Bend Air Products, Inc., South Bend, Ind.
Standard Electric Mfg. Co., West Berlin, N. J.
Thermal Industries, Indio, Calif.
Torrington Mfg. Co., Torrington, Conn.
Utility Appliance Corp., Los Angeles, Calif.
Victor Electric Products, Inc., Cincinnati, O.

BLAST GATES

See Gates, Blast

BLAST HEATERS

See Surface, Finned, Heating

BLAST HEATING COILS

See Surface, Finned, Heating

BLINDS, LINE, PIPE

Hamer Oil Tool Co., Long Beach, Cal.

BLOW PIPE FITTINGS

See Fittings, Blow Pipe

BLOWER FANS

See Fans, Axial Flow and Fans, Centrifugal

BLOWER HOUSINGS

See Housings, Fan

BLOWER WHEELS

See Wheels, Blower

BLOWERS, HIGH PRESSURE

For Low Pressure Blower Fans, See Fans, Centrifugal

● Aladdin Heating Corp., Oakland, Calif.
Allen Billmyre Div., Lamson Corp., Syracuse, N. Y.
● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
● American Blower Corp., Detroit, Mich.
Bayley Blower Co., Milwaukee, Wis.
Beach-Russ Co., New York, N. Y.
● Buffalo Forge Co., Buffalo, N. Y.
Carling Turbine Blower Co., Worcester, Mass.
Century Fan & Ventilator Co., Stamford, Conn.

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Champion Blower & Forge Co., Lancaster, Pa.
Chicago Blower Corp., Chicago, Ill.
● Clarage Fan Co., Kalamazoo, Mich.
Combustion Systems Div., Vapofier Corp., Chicago, Ill.
Day Co., The, Minneapolis, Minn.
De Laval Steam Turbine Co., Trenton, N. J.
Dynamic Air Engineering, Inc., Los Angeles, Calif.
Eastern Air Devices, Inc., Brooklyn, N. Y.
Electric Sprayit Co., The, Sheboygan, Wis.
● General Blower Co., Morton Grove, Ill.
Ingersoll-Rand Co., New York, N. Y.
● Joy Mfg. Co., Pittsburgh, Pa.
Lammert & Mann Co., Chicago, Ill.
Mahr Mfg. Co., Div. of Diamond Iron Wks., Inc., Minneapolis, Minn.
Martin Fan & Blower Co., Chicago, Ill.
North American Mfg. Co., Cleveland, O.
● Prat-Daniel Corp., East Port Chester, Conn.
Ripley Co., Inc., L-R Blower Div., Middletown, Conn.
Roots-Connersville Blower Corp., Connersville, Ind.
Spencer Turbine Co., Hartford, Conn.
Standard Stoker Co., Inc., Erie, Pa.
Trimount Rotary Power Co., Dedham, Mass.
● United States Air Conditioning Corp., Minneapolis, Minn.
Utility Appliance Corp., Los Angeles, Calif.
Western Blower Co., Seattle, Wash.
● Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
● Wing Mfg. Co., L. J., New York, N. Y.

BLOWERS, SOOT

Bayer Co., St. Louis, Mo.
Diamond Power Specialty Corp., Detroit, Mich.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Marion Machine Foundry & Supply Co., Marion, Ind.
Perfection Grate & Stoker Co., Springfield, Mass.

BLOW-OFF VALVES

See Valves, Blow-off

BLUE PRINT MACHINES

See Machines, Blue Print and White Print

BOILER CLEANING COMPOUNDS

See Compounds, Boiler Cleaning

BOILER FEED PUMPS

See Pumps, Boiler Feed

BOILER FEEDERS

See Feeders, Water, Heating Boiler

BOILER GAGES

See Gages, Liquid Level

BOILER OBSERVATION PORTS

See Ports, Observation, Boiler

BOILER SEALING COMPOUNDS

See Compounds, Boiler and Radiator Sealing

BOILER AND TANK INSULATION

See Insulation, Boiler and Tank

BOILER TUBES

See Tubes, Boiler

BOILER WATER ALARMS

See Alarms, High and Low Boiler Water

BOILERS, HEATING, CAST IRON, SECTIONAL

2000 Sq Ft Steam Radiation and Over

● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Bastian-Morley Co., Inc., LaPorte, Ind.
Bryant Heater Div., Affiliated Gas Equipment Co., Inc., Cleveland, O.
Burnham Corp., Boiler Div., Irvington, N. Y.
Columbia Radiator Co., McKeesport, Pa.
● Crane Co., Chicago, Ill.
Dunkirk Radiator Corp., Dunkirk, N. Y.
Herbert Boiler Co., Chicago, Ill.
International Heater Co., Utica, N. Y.
● Mueller Furnace Co., L. J., Milwaukee, Wis.
National Radiator Co., The, Johnstown, Pa.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Prox Co., Inc., Frank, Terre Haute, Ind.
Richmond Radiator Co., New York, N. Y.
Smith Co., Inc., H. B., The, Westfield, Mass.
● Spencer Heater Div., Avco Mfg. Corp., Williamsport, Pa.
● Surface Combustion Corp., Toledo, O.
United States Radiator Corp., Detroit, Mich.
Weil-McLain Co., Michigan City, Ind.

BOILERS, HEATING, STEEL, FIRE TUBE

2000 Sq Ft Steam Radiation and Over

● Aldrich Co., The, Wyoming, Ill.
Alert Engineering Products, Detroit, Mich.
American Shipbuilding Co., Cleveland, O.
● Ames Iron Works, Div. of Pierce Butler Radiator Corp., Oswego, N. Y.
Atlantic Steel Boiler Co., Philadelphia, Pa.
Bigelow Co., New Haven, Conn.
Birchfield Boiler, Inc., Tacoma, Wash.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
● Brownell Co., The, Dayton, O.
Burnham Corp., Boiler Div., Irvington, N. Y.
Combustion Engineering-Superheater, Inc., New York, N. Y.
Dewey-Shepard Boiler Co., Indianapolis, Ind.
Dillon Steam Boiler Wks., Inc., D. M. Fitchburg, Mass.
Dutton Co., C. H., Kalamazoo, Mich.
Erie City Iron Wks., Erie, Pa.
Farrar & Trefts, Buffalo, N. Y.
Federal Boiler Co., Inc., Midland Park, N. J.
● Fitzgibbons Boiler Co., Inc., New York, N. Y.
Frost Mfg. Co., Galesburg, Ill.
Hamburg Boiler Works, Inc., Hamburg, Pa.
Hodge Boiler Wks, East Boston, Mass.
International Engineering Wks., Inc., Framingham, Mass.
Johnston Bros., Inc., Ferrysburg, Mich.
● Kewanee Boiler Corp., Kewanee, Ill.
Leffel & Co., James, Springfield, O.
Loline Steel Boiler Co., Allentown, Pa.
Lookout Boiler & Mfg. Co., Chattanooga, Tenn.
Manitowoc Engineering Wks., Manitowoc, Wis.
● Mt. Hawley Mfg. Co., Inc., Peoria, Ill.
Murray Iron Wks. Co., Burlington, Ia.
National Radiator Co., The, Johnstown, Pa.
Pacific Steel Boiler Div., United States Radiator Corp., Detroit, Mich.
Republic Boiler Corp., New York, N. Y.
Smith Twin Tubular Boiler Co., Inc., Philadelphia, Pa.
● Spencer Heater Div., Avco Mfg. Corp., Williamsport, Pa.
Terre Haute Boiler Works Co., Terre Haute, Ind.
Titusville Iron Wks. Co., The, Titusville, Pa.
Union Iron Wks., Erie, Pa.
Wickes Boiler Co., Saginaw, Mich.

BOILERS, HEATING, STEEL, WATER TUBE

Anetsberger Bros., Inc., Northbrook, Ill.
Babcock & Wilcox Co., New York, N. Y.
Bigelow Co., The, New Haven, Conn.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Brown Products Co., Forest Hills, N. Y.
Bryan Steam Corp., Peru, Ind.
Central States Steel Boiler Co., Chicago, Ill.
Combustion Engineering-Superheater, Inc., New York, N. Y.
Crotty Mfg. Corp., Flushing, L. I., N. Y.
Dutton Co., C. H., Kalamazoo, Mich.
Edge Moor Iron Wks., Inc., Edge Moor, Del.
Erie City Iron Wks., Erie, Pa.
● General Oil Burner Corp., Baltimore, Md.
Heilman Boiler Wks., Inc., Allentown, Pa.
International Boiler Wks. Co., East Stroudsburg, Pa.
International Engineering Wks., Inc., Framingham, Mass.
Keeler Co., E., Williamsport, Pa.
Morheat Corp., Lansing, Mich.
Murray Iron Wks., Co., Burlington, Ia.
Riley Stoker Corp., Worcester, Mass.
Springfield Boiler Co., Springfield, Ill.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
Super Mold Corp., Lodi, Calif.
Titusville Iron Works Co., The, Titusville, Pa.
Union Iron Works, Erie, Pa.
Viking Mfg. Corp., Cleveland, O.
Waterfilm Boilers, Inc., Jersey City, N. J.
Wickes Boiler Co., Saginaw, Mich.
Will-Burt Co., The, Orrville, O.

BOILERS, PACKAGED STEAM GENERATING UNITS, HEATING AND PROCESS

Alert Engineering Products, Detroit, Mich.
● Ames Iron Works, Div. of Pierce Butler Radiator Corp., Oswego, N. Y.
Bigelow Co., New Haven, Conn. (electric)
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Brown Fintube Co., The, Elyria, O.
● Brownell Co., The., Dayton, O.
Clayton Mfg. Co., El Monte, Calif.
● Cleaver-Brooks Co., Milwaukee, Wis.
Combustion Engineering-Superheater, Inc., New York, N. Y.
Custom Engineering Co., Los Angeles, Calif. (electric)
Cyclotherm Corp., Oswego, N. Y.
Dutton Co., C. H., Kalamazoo, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Erie City Iron Works, Erie, Pa.
● Foster Wheeler Corp., New York, N. Y.
Heilman Boiler Wks., Inc., Allentown, Pa.
International Engineering Works, Inc., Framingham, Mass.
Johnson Co., S. T., Philadelphia, Pa.
Johnston Bros., Inc., Ferrysburg, Mich.
Keeler Co., E., Williamsport, Pa.

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● Kewanee Boiler Corp., Kewanee, Ill.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Leffel & Co., James, Springfield, O.
Livingstone Engineering Co., Worcester, Mass.
Martin Co., Inc., J. O., San Francisco, Calif.
Martin-Quaid Co., Philadelphia, Pa.
Mears-Kane-Ofeldt, Inc., Philadelphia, Pa.
Morheat Corp., Lansing, Mich.
Murray Iron Wks., Co., Burlington, Ia.
● Orr & Sembower, Inc., Reading, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Riley Stoker Corp., Worcester, Mass.
● Sellers Engineering Co., Chicago, Ill.
Stout & Sons, David, St. Louis, Mo.
● Superior Combustion Industries, Inc., Emmaus, Pa.
Titusville Iron Works Co., The, Titusville, Pa.
Union Iron Works, Erie, Pa.
Vapor Heating Corp., Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.
Wickes Boiler Co., Saginaw, Mich.
York-Shipley, Inc., York, Pa.

BOLTS, EXPANSION

Chase Brass & Copper Co., Waterbury, Conn.
Chicago Expansion Bolt Co., Chicago, Ill.
Diamond Expansion Bolt Co., Inc., Garwood, N. J.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Industrial Screw Co., Chicago, Ill.
National Lead Co., New York, N. Y.
Paine Co., Chicago, Ill.
Rawlplug Co., Inc., The, New York, N. Y.
Rolyan Metal Products, Chicago, Ill.
Star Expansion Bolt Co., New York, N. Y.
U. S. Expansion Bolt Co., York, Pa.

BOLTS AND STUDS, FLANGE

Bethlehem Steel Co., Bethlehem, Pa.
Buffalo Bolt Co., North Tonawanda, N. Y.
Chase Brass & Copper Co., Waterbury, Conn.
Clark Bros. Bolt Co., Milldale, Conn.
● Crane Co., Chicago, Ill.
Erie Bolt & Nut Co., Erie, Pa.
Harper Co., H. M., Morton Grove, Ill.
Haskell Mfg. Co., Wm. H., Pawtucket, R. I.
Industrial Screw Co., Chicago, Ill.
Lamson & Sessions Co., Cleveland, O.
Pheoll Mfg. Co., Chicago, Ill.
Republic Steel Corp., Bolt & Nut Div., Cleveland, O.
Rockford Screw Products Co., Rockford, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

BOLTS, TOGGLE AND ANCHOR

Carpenter & Paterson, Inc., East Boston, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Expansion Bolt Co., Chicago, Ill.
Crawford Co., Chicago, Ill.
Diamond Expansion Bolt Co., Inc., Garwood, N. J.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Industrial Screw Co., Chicago, Ill.
Moore, Inc., Goodloe E., Danville, Ill.
Paine Co., Chicago, Ill.
Rawlplug Co., Inc., The, New York, N. Y.
Star Expansion Bolt Co., New York, N. Y.
U. S. Expansion Bolt Co., York, Pa.

BOOTHS, PAINTING, SPRAY

Binks Mfg. Co., Chicago, Ill.
Centri-Spray Corp., Detroit, Mich. (wet type)
Circulators & Devices Mfg. Corp., New York, N. Y.
DeVilbiss Co., The, Toledo, O.
Electric Sprayit Co., The, Sheboygan, Wis.
Goethel Sheet Metal Works, Alfred, Milwaukee, Wis.
Kirk & Blum Mfg. Co., Cincinnati, O.
Mahon Co., R. C., Detroit, Mich.
Newcomb-Detroit Co., Detroit, Mich.
Peters-Dalton, Inc., Detroit, Mich.
Plummer Spray Equipment Co., Napolean, O.
Schmieg Industries, Detroit, Mich.
Spray Engineering Co., Somerville, Mass.
Young & Bertke Co., Cincinnati, O.

BRAKES, SHEET METAL, HAND

Barth Mfg. Co., Milldale, Conn.
Dreis & Krump Mfg. Co., Chicago, Ill.
Eiker Mfg. Co., Ogallala, Neb.
Excelsior Tool & Machine Co., East St. Louis, Ill.
New Albany Machine Mfg. Co., New Albany, Ind.
Niagara Machine & Tool Works, Buffalo, N. Y.
O'Neil Irwin Mfg. Co., Lake City, Minn.
Peck, Stow & Wilcox Co., Southington, Conn.
St. Louis Tool Co., St. Louis, Mo.
Webb Machine & Tool Co., Pittsburgh, Pa.
Weiss & Co., H., New York, N. Y.
Whitney Metal Tool Co., Rockford, Ill.

BRAKES, SHEET METAL, PORTABLE

Barth Mfg. Co., Milldale, Conn.
Dreis & Krump Mfg. Co., Chicago, Ill.
Eiker Mfg. Co., Ogallala, Neb.
Harris, A. R., Hammond, Ind.
O'Neil Irwin Mfg. Co., Lake City, Minn.
Webb Machine & Tool Co., Pittsburgh, Pa.
Whitney Metal Tool Co., Rockford, Ill.

BRAKES, SHEET METAL, POWER

Bath Co., Cyril, The, Cleveland, O.
Cincinnati Shaper Co., Cincinnati, O.
Cleveland Tramrail Div., Cleveland Crane & Enigneering Co., Wickliffe, O.
Dreis & Krump Mfg. Co., Chicago, Ill.
Heartley Machine & Tool Co., Toledo, O.
Munton Mfg. Co., Franklin Park, Ill.
Ohl & Co., Geo. A., Newark, N. J.
Peck, Stow & Wilcox Co., Southington, Conn.
Verson Allsteel Press Co., Chicago, Ill.
Verson Mfg. Co., The, Dallas, Tex.
Weiss & Co., H., New York, N. Y.
Whitney Metal Tool Co., Rockford, Ill.
Wilson Co., K. R., Buffalo, N. Y.

BRASS PIPE

See Pipe, Brass and Copper

BRASS TUBING

See Tubing, Brass and Copper

BRASS UNIONS

See Unions, Brass

BRASS VALVES

See Valves, Gate; and Valves, Globe

BRAZING TORCHES

See Torches, Brazing

BREAKERS, VACUUM (For Steam Using Equipment)

Bailey Co., Chas. M., San Francisco, Calif.
● Hoffman Specialty Co., Indianapolis, Ind.
McAlear Mfg. Co., Chicago, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.

BRONZE VALVES

See Valves, Gate; and Valves, Globe

BUILDING INSULATION

See Insulation, Building

BURNERS, GAS, COMMERCIAL AND INDUSTRIAL

Automatic Firing Corp., St. Louis, Mo.
Barber Gas Burner Co., Cleveland, O.
Barton Co., Minneapolis, Minn.
Beck Engineering Combustion Kompany, St. Louis, Mo.
Bryant Corp., C. L., Cleveland, O.
Bryant Heater Div., Affiliated Gas Equipment Co., Inc., Cleveland, O.
Campbell Heating Co., E. K., Kansas City, Mo.
Central States Mfg. Co., Inc., Arkansas City, Kan.
Certified Furnace Co., Div. Stainless & Steel Products Co., St. Paul, Minn.
Combustion Systems Div., Vapofier Corp., Chicago, Ill.
Coppus Engineering Corp., Worcester, Mass.
Dalzen Tool & Mfg. Co., Detroit, Mich.
Eclipse Fuel Engrg. Co., Rockford, Ill.
Engineer Co., New York, N.Y.
● Enterprise Engine & Foundry Co., San Francisco, Calif.
Faber Engineering Co., Inc., Philadelphia, Pa.
Finn Engineers, Jerry, St. Paul, Minn.
Forney Engineering Co., Dallas, Tex.
Fuelguard Co., Dallas, Tex.
● Gold Top Heating, Inc., Butte, Mont.
● Haney Gas Burner & Engineers, Monrovia, Calif.
Iron Fireman Mfg. Co., Cleveland, O.
Jamieson Mfg. Co., Dallas, Tex.
Johnson Gas Appliance Co., Cedar Rapids, Ia.
Kindl-Air Corp., Cleveland, O.
Lientz Co., B. P., Kansas City, Mo.
Mahr Mfg. Co., Div. of Diamond Iron Wks., Inc., Minneapolis, Minn.
Martin Co., Inc., J. O., San Francisco, Calif.
● Mettler Co., Lee B., Los Angeles, Calif.
● Mid-Continent Metal Products Co., Chicago, Ill.

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National Airoil Burner Co., Inc., Philadelphia, Pa.
Newcomb-Detroit Co., Detroit, Mich.
Norman Products Co., Inc., Columbus, O.
North American Mfg. Co., Cleveland, O.
Peabody Engrg. Corp., New York, N. Y.
Ray Oil Burner Co., San Francisco, Calif.
● Reinhard Brothers Co., Minneapolis, Minn.
Roberts-Gordon Appliance Corp., Buffalo, N. Y.
Rotary Mfg. Co., Los Angeles, Calif.
Selas Corp. of America, Philadelphia, Pa.
● Sellers Engineering Co., Chicago, Ill.
Siemon & Co., Kansas City, Mo.
Sonner Burner Co., Winfield, Kan.
Standard Fuel & Engineering Co., Detroit, Mich.
Staples & Pfeiffer, San Francisco, Calif.
Stout & Sons, David, St. Louis, Mo.
● Superior Combustion Industries, Inc., Emmaus, Pa.
● Surface Combustion Corp., Toledo, O.
Todd Shipyards Corp., Combustion Equipment Div., Elmhurst, L. I., N. Y.
● Webster Engineering Co., Tulsa, Okla.
● Zink Co., John, Tulsa, Okla.
Zurn Mfg. Co., J. A., Industrial Div., Erie, Pa.

BURNERS, GAS AND OIL COMBINED, COMMERCIAL AND INDUSTRIAL

Automatic Firing Corp., St. Louis, Mo.
Babcock & Wilcox Co., New York, N. Y.
Coppus Engineering Corp., Worcester, Mass.
Eclipse Fuel Engineering Co., Rockford, Ill.
Engineer Co., New York, N. Y.
● Enterprise Engine & Foundry Co., San Francisco, Calif.
Faber Engineering Co., Inc., Philadelphia, Pa.
Forney Engineering Co., Dallas, Tex.
● Haney Gas Burner & Engineers, Monrovia, Calif.
Iron Fireman Mfg. Co., Cleveland, O.
Johnson Co., S. T., Philadelphia, Pa.
Lammert & Mann Co., Chicago, Ill.
Lientz Co., B. P., Kansas City, Mo.
Mahr Mfg. Co., Div. of Diamond Iron Wks., Inc., Minneapolis, Minn.
● Mettler Co., Lee B., Los Angeles, Calif.
National Airoil Burner Co., Inc., Philadelphia, Pa.
North American Mfg. Co., Cleveland, O.
Pan-American Engineering Co., Berkeley, Calif.
Peabody Engineering Corp., New York, N. Y.
Ray Oil Burner Co., San Francisco, Calif.
Siemon & Co., Kansas City, Mo.
Simplex Oil Heating Corp., New York, N. Y.
Staples & Pfeiffer, San Francisco, Calif.
● Superior Combustion Industries, Inc., Emmaus, Pa.
● Surface Combustion Corp., Toledo, O.
Todd Shipyards Corp., Combustion Equipment Div., Elmhurst, L. I., N. Y.
● Webster Engineering Co., Tulsa, Okla.
● Zink Co., John, Tulsa, Okla.

BURNERS, OIL, COMMERCIAL AND INDUSTRIAL

Ace Engineering Co., Chicago, Ill. (Rotary)
Airtemp, Div. of Chrysler Corp., Dayton, O.
● Aldrich Co., The, Wyoming, Ill.
American Heat Corp., Boston, Mass. (Steam atomizing)
Auburn Burner Co., Auburn, Ind.
Automatic Firing Corp., St. Louis, Mo.
Babcock & Wilcox Co., New York, N. Y.
Best Combustion Equipment Co., Inc., W. N., New York, N. Y.
Caloroil Burner Corp., Hartford, Conn.
Catskill Metal Works, Inc., Catskill, N. Y.
Century Engrg. Corp., Cedar Rapids, Ia.
Certified Furnace Co., Div. Stainless & Steel Products Co., St. Paul, Minn.
Chandler Co., Cedar Rapids, Ia.
Chisholm Co., Allen E., Portland, Ore.
Conco Engineering Works, Div. of H. D. Conkey & Co., Mendota, Ill.
Crotty Mfg. Corp., Flushing, L. I., N. Y.
Dalmo-Victor Co., San Carlos, Calif.
Delco Appliance Div., General Motors Corp., Rochester, N. Y.
Drying Systems, Inc., Chicago, Ill.
Eckhart Mfg. Co., Inc., Roselle, N. J. (High pressure atomizing)
Electrol Burner Mfg. Co., Inc., Rutherford, N. J.
Engineering Co., New York, N. Y.
● Enterprise Engine & Foundry Co., San Francisco, Calif.
Faber Engineering Co., Inc., Philadelphia, Pa.
Forney Engineering Co., Dallas, Tex. (both steam atomizing & mechanical)
Fuel Savers, Inc., Harrisburg, Pa. (high pressure)
● General Oil Burner Corp., Baltimore, Md.
Gilbert & Barker Mfg. Co., West Springfield, Mass.
Hardinge Oil Burner & Mfg. Co., Chicago, Ill.
Harvey-Whipple, Inc., Springfield, Mass.
Holtum Mfg. Co., Freeport, Ill.
Iron Fireman Mfg. Co., Cleveland, O. (Rotary atomizing, high pressure atomizing)
Jackson & Church Co., Saginaw, Mich.
Johnson Co., S. T., Philadelphia, Pa.
Kleen-Heet, Inc., Chicago, Ill.
Kol-Master Corp., Oregon, Ill. (high pressure)
Lammert & Mann Co., Chicago, Ill.
Lancaster Heat Transfer Co., Inc., Brooklyn, N. Y.
Lieblich Oil Burner Inc., New York, N. Y.
Lientz Co., B. P., Kansas City, Mo. (steam atomizing)
Mahr Mfg. Co., Div. of Diamond Iron Wks., Inc., Minneapolis, Minn.
Malleable Iron Fittings Co., Branford, Conn. (High pressure atomizing)
● Mettler Co., Lee B., Los Angeles, Calif.
Montag Stove & Furnace Works, Portland, Ore.
● Mt. Hawley Mfg. Co., Inc., Peoria, Ill.
National Airoil Burner Co., Inc., Philadelphia, Pa.
National Oil Burner Co. of N. Y. Inc., Brooklyn, N. Y. (Horizontal rotary)
North American Mfg. Co., Cleveland, O.
Nu-Way Corp., The, Rock Island, Ill.
Oilux Co., Fort Wayne, Ind.
Pan-American Engineering Co., Berkeley, Calif.
Peabody Engrg. Corp., New York, N. Y.
Petroleum Heat & Power Co., Stamford, Conn.
Preferred Utilities Mfg. Corp., New York, N. Y.
Radiant Utilities Corp., Brooklyn, N. Y. (high pressure)
Ray Oil Burner Co., San Francisco, Calif. (High pressure atomizing rotary)
Rayfield Co., C. L., Chicago, Ill. (Low pressure atomizing)
Reif-Rexoil, Inc., Buffalo, N. Y.
Riley Stoker Corp., Worcester, Mass.
Rotary Mfg. Co., Los Angeles, Calif.
Schutte & Koerting Co., Philadelphia, Pa.
Scott-Newcomb, Inc., St. Louis, Mo.
Simplex Oil Heating Corp., New York, N. Y. (Low and high pressure atomizing, and horizontal rotary types)
Staples & Pfeiffer, San Francisco, Calif.
Sun-Ray Burner Mfg. Corp., Jamaica, N. Y.
● Superior Combustion Industries, Inc., Emmaus, Pa.
Todd Shipyards Corp., Combustion Equipment Div., Elmhurst, L. I., N. Y. (Variable capacity, rotary, pressure atomizing, steam atomizing)
U. S. Machine Corp., Lebanon, Ind.
Vapofier Corp., Chicago, Ill. (Pre-mixed gaseous fuel generator)
● Webster Engineering Co., Tulsa, Okla.
Will-Burt Co., The, Orrville, O. (High pressure)
Williams Oil-O-Matic Div., Eureka Williams Corp., Bloomington, Ill.
York-Shipley, Inc., York, Pa. (Rotary, high pressure atomizing)
● Zink Co., John, Tulsa, Okla.

BURNERS, PULVERIZED COAL, COMMERCIAL AND INDUSTRIAL

Babcock & Wilcox Co., New York, N. Y.
Combustion Engineering-Superheater, Inc., New York, N. Y.
Peabody Engineering Corp., New York, N. Y.
Riley Stoker Corp., Worcester, Mass.
Whiting Corp., Harvey, Ill.

BURNERS, PULVERIZED COAL AND GAS, COMBINED, COMMERCIAL AND INDUSTRIAL

Babcock & Wilcox Co., New York, N. Y.
Combustion Engineering-Superheater, Inc., New York, N. Y.
● Foster Wheeler Corp., New York, N. Y.
Peabody Engineering Corp., New York, N. Y.
Riley Stoker Corp., Worcester, Mass.

BURNERS, PULVERIZED COAL AND OIL, COMBINED, COMMERCIAL AND INDUSTRIAL

Babcock & Wilcox Co., New York, N. Y.
Combustion Engineering-Superheater, Inc., New York, N. Y.
Engineer Co., New York, N. Y.
● Foster Wheeler Corp., New York, N. Y.
Peabody Engineering Corp., New York, N. Y.
Riley Stoker Corp., Worcester, Mass.

CAPS, VENT FLUE

Accurate Sheet Metal Mfg. Works, Chicago, Ill.
Airjet Ventilator Co., Pasadena, Calif.
● Breidert Co., G. C., Los Angeles, Calif.
Oil Equipment Mfg. Corp., New Haven, Conn.
Penn Ventilating Co., Philadelphia, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.

CARBON DIOXIDE ANALYZERS

See Analyzers, Carbon Dioxide, Portable

CARBON DIOXIDE INDICATORS

See Indicators, Carbon Dioxide, Boiler Room

CARBON PIPE, TUBING, FITTINGS AND VALVES

See Pipe, Tubing, Fittings and Valves, Carbon and Graphite

CAST IRON PIPE

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CEMENT AND COMPOUNDS, PIPE JOINT

Acme Refining Co., The, Cleveland, O.
Acorn Refining Co., Cleveland, O.
Akron Metallic Gasket Co., Akron, O.
Arco Co., Cleveland, O.
Atlas Chemical Co., Marietta, O.
Babbitt Chemical Specialties Co., New York, N. Y.
Baer Bros., New York, N. Y.
Black Magic Products Co., Tulsa, Okla.
Blue Ridge Talc Co., Inc., Henry, Va.
Blue Seal Chemical Co., Roselle Park, N. J.
Bowser, Inc., Fort Wayne, Ind.
Cabot, Inc., Samuel, Boston, Mass.
Calbar Paint & Varnish Co., Philadelphia, Pa.
Chicago Specialty Mfg. Co., Chicago, Ill.
Colebrook & Sons, Inc., W. H., Syracuse, N. Y.
Continental Products Co., Euclid, O.
● Crane Co., Chicago, Ill.
Crane Packing Co., Chicago, Ill.
Croll & Son, Jesse G., Philadelphia, Pa.
Diamond Chemical Products, New York, N. Y.
Dixon Crucible Co., Joseph, Jersey City, N. J.
Felt Products Mfg. Co., Chicago, Ill.
Garlock Packing Co., Palmyra, N. Y.
Greene, Tweed & Co., North Wales, Pa.
● Grinnell Co., Inc., Providence, R. I.
Hercules Chemical Co., Inc., New York, N. Y.
Hetzel Roofing Products Co., Newark, N. J.
Horn Co., Inc., A. C., Long Island City, N. Y.
Kenite Laboratory, Inc., Madison, N. J.
● Key Co., East St. Louis, Ill.
Keystone Asphalt Products Co., Chicago, Ill.
Krehbiel Co., J. H., Chicago, Ill.
Lake Chemical Co., Chicago, Ill.
Lastik Products Co., Inc., Pittsburgh, Pa.
Macksons Co., New York, N. Y.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
Milwaukee Gas Specialty Co., Milwaukee, Wis.
Montgomery Bros., San Francisco, Calif.
National Engineering Products, Inc., Washington, D. C.
Nebel Mfg. Co., Cleveland, O.
Oil Equipment Mfg. Corp., New Haven, Conn.
Pecora Paint Co., Inc., Philadelphia, Pa.
Permatex Co., Inc., Brooklyn, N. Y.
Pyrolite Products Co., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Radiator Specialty Co., Charlotte, N. C.
Reilly Tar & Chemical Corp., Indianapolis, Ind.
Rutland Fire Clay Co., Rutland, Vt.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Sauereisen Cements Co., Pittsburgh, Pa.
Saverite Engineering Co., Hoboken, N. J.
Schundler & Co., F. E., Long Island City, N. Y.
Smooth-On Mfg. Co., Jersey City, N. J.
Star Products Co., New York, N. Y.
Sulflo, Inc., Elizabeth, N. J.
United States Stoneware Co., New York, N. Y.
Utility Laboratory, Inc., Brooklyn, N. Y.
Wilhelm Co., A., Reading, Pa.
X Laboratories, Inc., New York, N. Y.
X-Pando Corp., Long Island City, N. Y.

CEMENT, FURNACE

Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Armstrong Co., Detroit, Mich.
● Armstrong Cork Co., Lancaster, Pa.
Botfield Refractories Co., Philadelphia, Pa.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Chicago Fire Brick Co., Chicago, Ill.
Chicago Specialty Mfg. Co., Chicago, Ill.
Clinton Metallic Paint Co., Clinton, N. Y. (Asbestos)
Continental Products Co., Euclid, O.
Fireline Stove & Furnace Lining Co., Chicago, Ill.
Grant Wilson, Inc., Chicago, Ill.
Foster Co., Benjamin, Philadelphia, Pa.
Green Fire Brick Co., Mexico, Mo.
Hercules Chemical Co., Inc., New York, N. Y.
Johns-Manville, New York, N. Y.
Krehbiel Co., J. H., Chicago, Ill.
Laclede-Christy Co., St. Louis, Mo.
Lastik Products Co., Inc., Pittsburgh, Pa.
McLeod & Henry Co., Inc., Troy, N. Y.
Nebel Mfg. Co., Cleveland, O.
Pecora Paint Co., Inc., Philadelphia, Pa.
Plastic Products Co., Detroit, Mich.
Presstite Engineering Co., St. Louis, Mo.
Pyrolite Products Co., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Ramtite Co., The, Chicago, Ill.
Refractory & Insulation Corp., New York, N. Y.
Rutland Fire Clay Co., Rutland, Vt.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
● Sall Mountain Co., Chicago, Ill.
Sauereisen Cements Co., Pittsburgh, Pa.
Standard Asbestos Mfg. Co., Chicago, Ill.
Standard Fuel Engineering Co., Detroit, Mich.
Tamms Industries, Inc., Chicago, Ill.
Taylor Sons Co., Charles, Cincinnati, O.
United States Stoneware Co., New York, N. Y.
Utility Laboratory, Inc., Brooklyn, N. Y.
Walsh Refractories Corp., St. Louis, Mo.

CEMENT, INSULATING

Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Altos Mineral Wool Insulation Co., St. Louis, Mo.
● Armstrong Cork Co., Lancaster, Pa.
Baldwin-Hill Co., Trenton, N. J. (mineral wool)
Barrett Div., The, Allied Chemical & Dye Corp., New York, N. Y.
Bird-Archer Co., Philadelphia, Pa.
Botfield Refractories Co., Philadelphia, Pa.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Carney Co., Inc., The, Mankato, Minn.
Chicago Fire Brick Co., Chicago, Ill.
Colebrook & Sons, Inc., W. H., Syracuse, N. Y.
Eagle-Picher Co., Cincinnati, O.
Grant Wilson, Inc., Chicago, Ill.
Green Fire Brick Co., Mexico, Mo.
International Vermiculite Co., Girard, Ill.
Johns-Manville, New York, N. Y.
Keasbey Co., Robert A., New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa. (85 per cent magnesia)
Krehbiel Co., J. H., Chicago, Ill. (Asbestos, mineral wool)
Laclede-Christy Co., St. Louis, Mo.
Moore, Inc., Goodloe E., Danville, Ill.
Munn and Steele, Inc., Newark, N. J.
National Engineering Products, Inc., Washington, D. C.
National Gypsum Co., Buffalo, N. Y.
Nelson Mfg. Co., B. F., Minneapolis, Minn.
Norristown Magnesia & Asbestos Co., Norristown, Pa.
● Owens-Corning Fiberglas Corp., Toledo, O.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Paraffine Companies, Inc., The., Insulation Div., San Francisco, Calif.
Peterson Co., B. A., Dowagiac, Mich.
Plibrico Jointless Firebrick Co., Chicago, Ill.
Poe Co., C. W., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Ramtite Co., The, Chicago, Ill.
Refractory & Insulation Corp., New York, N. Y.
Rex Clay Products Co., Detroit, Mich.
Rock Fleece Co., El Paso, Tex.
Ruberoid Co., New York, N. Y.
Rutland Fire Clay Co., Rutland, Vt.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
● Sall Mountain Co., Chicago, Ill.
Schundler & Co., Inc., F. E., Long Island City, N. Y.
Smith & Kanzler Corp., Linden, N. J.
Standard Asbestos Mfg. Co., Chicago, Ill.
Standard Fuel Engineering Co., Detroit, Mich.
Union Asbestos & Rubber Co., Cicero, Ill.
United States Mineral Wool Co., South Milwaukee, Wis.
● Zonolite Co., Chicago, Ill.

CENTRIFUGAL PUMPS

See Pumps, Centrifugal

CHAIN DRIVES

See Drives, Chain

CHAMBERS, COMBUSTION, PREFORMED

Barclay, Inc., Robert, Chicago, Ill.
Green Fire Brick Co., Mexico, Mo.
McLeod & Henry Co., Inc., Troy, N. Y.
Monogram Products Co., Philadelphia, Pa.
Munn and Steel, Inc., Newark, N. J.
Oil Equipment Mfg. Corp., New Haven, Conn.
Peterson Co., B. A., Dowagiac, Mich.
Preferred Utilities Mfg. Corp., New York, N. Y.
Refractory & Insulation Corp., New York, N. Y.
Rex Clay Products Co., Detroit, Mich.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Stuart Co., W. W., Des Moines, Ia.
Walsh Refractories Corp., St. Louis, Mo.
● Zonolite Co., Chicago, Ill.

CHAMBERS, TEST, CONTROLLED TEMPERATURE AND HUMIDITY

Tenney Engineering, Inc., Newark, N. J.
● York Corp., York, Pa.

CHANGERS, SPEED, HYDRAULIC COUPLING

● American Blower Corp., Detroit, Mich.
CraneVeyor Corp., Los Angeles, Calif.
Greer Hydraulics, Inc., Brooklyn, N. Y.

● Advertisement in this issue. See Index to Advertisers, page 120d

- Link-Belt Co., Philadelphia, Pa.
- Reuland Electric Co., Alhambra, Calif. (combined electric motor and fluid drive coupling)
- Twin Disc Clutch Co., Rockford, Ill.

CHANGERS, SPEED, MAGNETIC

- Electric Machinery Mfg. Co., Minneapolis, Minn.
- Reliance Electric & Engineering Co., Cleveland, O.

CHANGERS, SPEED, MECHANICAL

- ● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
- Doall Co., The, Des Plaines, Ill.
- Graham Transmissions, Inc., Milwaukee, Wis.
- Lewellen Mfg. Co., Columbus, Ind.
- Lima Electric Motor Co., Lima, O.
- Link-Belt Co., Philadelphia, Pa.
- Lovejoy Flexible Coupling Co., Chicago, Ill.
- Master Electric Co., Dayton, O.
- Reeves Pulley Co., Columbus, Ind.
- Salsbury Motors, Inc., Pomona, Calif.
- Standard Transmission Equipment Co., Pasadena, Calif.
- Steam Turbine Div., Worthington Pump & Machinery Corp., Wellsville, N. Y.
- ● Stephens-Adamson Mfg. Co., Aurora, Ill.
- Sterling Electric Motors, Inc., Los Angeles, Calif.
- U. S. Electrical Motors, Inc., Los Angeles, Calif.
- Webster Electric Co., Racine, Wis.
- White Mfg. Co., St. Paul, Minn.
- Worthington Pump & Machinery Corp., Harrison, N. J.

CHECK VALVES

See Valves, Check

CHILLERS, WATER, FOR AIR CONDITIONING AND REFRIGERATION

- ● Acme Industries, Inc., Jackson, Mich.
- Armstrong Co., Richard M., Westchester, Pa.
- Baker Refrigeration Corp., South Windham, Me.
- ● Bell & Gossett Co., Morton Grove, Ill.
- Brown Fintube Co., The, Elyria, O.
- ● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
- Croll-Reynolds Engineering Co., Inc., New York, N. Y.
- Dahlquist Mfg. Co. Inc., Div. of Process Engineering, Inc., Somerville, Mass.
- ● Davis Engineering Corp., Elizabeth, N. J.
- ● Doyle & Roth Mfg. Co., Brooklyn, N. Y.
- Drayer & Hanson, Inc., Los Angeles, Calif.
- Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
- ● Frick Co., Waynesboro, Pa.
- General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
- General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
- Graham Mfg. Co., Inc., New York, N. Y.
- Griscom-Russell Co., The, New York, N. Y.
- Halstead & Mitchell, Pittsburgh, Pa.
- ● Howe Ice Machine Co., Chicago, Ill.
- Larkin Coils, Atlanta, Ga.
- McQuay, Inc., Minneapolis, Minn.
- ● Niagara Blower Co., New York, N. Y.
- Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
- Reco Products Div., Refrigeration Engineering Corp., Philadelphia, Pa.
- Refrigeration Economics Co., Inc., Canton, O.
- Richmond Engineering Co., Inc., Richmond, Va.
- Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
- Sims Co., Erie, Pa.
- Standard Heater & Oil Equipment Co., Jersey City, N. J.
- Temprite Products Corp., Detroit, Mich.
- ● Trane Co., The, LaCrosse, Wis.
- ● Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
- Vilter Mfg. Co., The, Milwaukee, Wis.
- ● Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
- ● Whitlock Mfg. Co., Hartford, Conn.
- Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
- X L Refrigerating Co., Chicago, Ill.
- ● York Corp., York, Pa.

CIRCULATORS FOR HOT WATER HEATING SYSTEMS

- Alliance Industries, Huntingden Valley, Pa.
- American-Marsh Pumps, Inc., Battle Creek, Mich.
- ● Bell & Gossett Co., Morton Grove, Ill.
- Columbus Steam Pump Works Co., Columbus, O.
- Davidson Co., M. T., Brooklyn, N. Y.
- Everite Pump & Mfg. Co., Inc., Lancaster, Pa.
- Fairbanks, Morse & Co., Chicago, Ill.
- Hotstream Heater Co., Cleveland, O.
- Kainer & Co., Chicago, Ill.
- Kehm Corp., The, Chicago, Ill.
- ● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- Piqua Machine & Mfg. Co., Piqua, O.
- Quality Specialty Co., Inc., Philadelphia, Pa.
- Standard Electric Mfg. Co., West Berlin, N. J.
- Taco Heaters, Inc., Providence, R. I.
- ● Thrush & Co., H. A., Peru, Ind.
- ● Trane Co., The, LaCrosse, Wis.
- Triplex Heating Specialty Co., Inc., Peru, Ind.
- ● Weil Pump Co., Chicago, Ill.
- White Flomatic Corp., Hoosick Falls, N. Y.
- Yula Water Heaters Inc., New York, N. Y.

CLAMPS, BEAM, PIPE HANGING

- Carpenter & Paterson, Inc., East Boston, Mass.
- Chicago Nipple Mfg. Co., Cicero, Ill.
- Crawford Co., Chicago, Ill.
- Farley Sleeve & Hanger Co., Cleveland, O.
- Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
- ● Frick Co., Waynesboro, Pa.
- Genspring, Inc., New York, N. Y.
- Grabler Mfg. Co., Cleveland, O.
- ● Grinnell Co., Providence, R. I.
- Hupp Corp., Globe Stamping Div., Cleveland, O.
- Moore, Inc., Goodloe E., Danville, Ill.
- National Valve & Mfg. Co., Pittsburgh, Pa.
- Paine Co., Chicago, Ill.
- Rockwood Sprinkler Co., Worcester, Mass.
- ● Unistrut Products Co., Chicago, Ill.
- ● Walworth Co., New York, N. Y.

CLAMPS, HOSE

- Actus Corp., Mount Vernon, N. Y.
- Everhot Products Co., Chicago, Ill.
- Flexible Tubing Corp., Branford, Conn.
- Marman Products Co., Inc., Inglewood, Calif.
- Tinnerman Products, Inc., Cleveland, O.

CLAMPS, PIPE REPAIR

- Altens Foundry & Machine Works, Inc., Lancaster, O.
- Chelsea Metal Stamping Co., New York, N. Y.
- Chicago Specialty Mfg. Co., Chicago, Ill.
- Clow & Sons, James B., Chicago, Ill.
- Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
- Inner-Tite Div. of Yara Engineering Corp., Elizabeth, N. J.
- Jarecki Mfg. Co., Erie, Pa.
- Marman Products Co., Inc., Inglewood, Calif.
- Morris Coupling & Clamp Co., Ellwood City, Pa.
- Rensselaer Valve Co., Cohoes, N. Y.
- ● Ritter Pattern & Casting Co., Inc., New York, N. Y.
- Skinner Co., M. B., South Bend, Ind.
- Smooth-On Mfg. Co., Jersey City, N. J.
- ● Yarnall-Waring Co., Philadelphia, Pa.

CLAMPS, PIPE, WELDING

- Detroit Stamping Co., Detroit, Mich.
- Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
- Jewel Mfg. Co., St. Paul, Minn.
- Williams & Co., J. H., Buffalo, N. Y.

CLEANERS, AIR, ELECTRICAL

- Air-Maze Corp., Cleveland, O.
- ● American Air Filter Co., Inc., Louisville, Ky.
- Bartlett Hayward, Div. of Koppers Co., Baltimore, Md.
- Lennox Furnace Co., Marshalltown, Ia., Syracuse, N. Y. & Columbus, O
- Raytheon Mfg. Co., Commercial Products Div., Waltham, Mass.
- Thermix Corp., The, Greenwich, Conn.
- Trion, Inc., McKees Rocks, Pa.
- ● Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.

CLEANERS, TUBE

- Armstrong Mfg. Co., Bridgeport, Conn.
- Blackburn-Smith Mfg. Co., Hoboken, N. J.
- ● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
- Elliott Co., Jeannette, Pa.
- Huyette Co., Inc., Paul B., Philadelphia, Pa.
- Osborn Mfg. Co., Cleveland, O.
- Perfection Grate & Stoker Co., Springfield, Mass.
- Pierce Co., Wm. B., The, Buffalo, N. Y.
- Pilley Brush Co., Fort Madison, Ia.
- Rosedale Foundry & Machine Co., Pittsburgh, Pa.
- Spencer Turbine Co., Hartford, Conn.
- Wilson, Inc., Thomas C., Long Island City, N. Y.
- ● York Corp., York, Pa.

CLEANERS, VACUUM, FOR BOILERS

- Allen Billmyre Div., Lamson Corp., Syracuse, N. Y.
- Doyle Vacuum Cleaner Co., Grand Rapids, Mich.
- Ideal Industries, Inc., Sycamore, Ill.
- Spencer Turbine Co., Hartford, Conn.

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CLEANING COMPOUNDS

See Compounds, Cleaning, Pipe Coil and Condenser

CLEANING COMPOUNDS, AIR FILTER

See Compounds, Cleaning, Air Filter

CLEANING MACHINES, PIPE

See Machines, Pipe Cleaning

COAL BURNERS

See Burners, Pulverized Coal; Stokers

COAL CONVEYORS

See Conveyors, Coal and Ash

COATINGS, PROTECTIVE, FOR METALS

Aeroil Products Co., Inc., South Hackensack, N. J.
Alrose Chemical Co., Providence, R. I.
Amercoat Div., American Pipe & Construction Co., South Gate, Calif.
American Chemical Paint Co., Ambler, Pa.
American Hard Rubber Co., New York, N. Y. (hard & soft rubber)
American Solder & Flux Co., Philadelphia, Pa. (Galvanizing powder)
Apex Engineering Co., Chicago, Ill. (Water cured protective tank lining for field application only)
● Armstrong Cork Co., Lancaster, Pa. (asphalt for weather & low temperatures)
Barrett Div., The, Allied Chemical & Dye Corp., New York, N. Y. (Pitchbase)
Bart Mfg. Co., Inc., Belleville, N. J.
Blue Ridge Talc Co., Inc., Henry, Va.
Bonafide Genasco, Inc., New York, N. Y. (asphalt)
Brooklyn Varnish Mfg. Co., Brooklyn, N. Y.
Cabot Inc., Samuel, Boston, Mass. (Bituminuous black paint)
Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O. (Asphalt and aluminum paints)
Colonial Alloys Co., Metals Div., Philadelphia, Pa. (anodizing chemical oxidizing for aluminum)
● Condenser Service & Engineering Co., Inc., Hoboken, N. J. (Metal spray)
Cordo Chemical Co., Norwalk, Conn.
Dampney Co. of America, Boston, Mass.
Dearborn Chemical Co., Chicago, Ill. (Rust preventive)
Debevoise Co., The, Brooklyn, N. Y.
Dow Corning Corp., Midland, Mich.
du Pont de Nemours & Co. (Inc.), E. I., Fabrics & Finishes Dept., Wilmington, Del.
Eagle-Picher Co., Cincinnati, O.
Flintkote Co., The, New York, N. Y. (Asphalt emulsions)
Foster Co., Benjamin, Philadelphia, Pa.
Galv-Weld Products, Dayton, O. (Regalvanizing)
Gates Engineering Co., Wilmington, Del.
Goodrich Co., B. F., Akron, O.
Haering & Co., Inc., D. W., Chicago, Ill. (Drying and non-drying)
Hardy, Inc., Charles, New York, N. Y. (18-8 stainless steel paste)
Heresite & Chemical Co., Manitowoc, Wis. (Synthetic)
Houghton & Co., E. F., Philadelphia, Pa.
Industrial Metal Protectives, Inc., Dayton, O.
Interchemical Corp., Finishes Div., Newark, N. J.
Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
Kellogg Co., M. W., The, New York, N. Y. (Heat resisting)
Knight, Maurice A., Akron, O. (Vinyl plastic base)
Koppers Co., Inc., Pittsburgh, Pa. (coal tar)
Lastik Products Co., Inc., Pittsburgh, Pa.
Lithgow Corp., Chicago, Ill.
Maas & Waldstein Co., Newark, N. J.
Midland Paint & Varnish Co., Cleveland, O.
● Miracle Adhesives, Corp., New York, N. Y.
Monsanto Chemical Co., Merimac Div., Boston, Mass. (synthetics)
Mortell Co., J. W., Kankakee, Ill. (Asphalt)
National Lead Co., New York, N. Y. (Red lead)
National Lining Co., Chicago, Ill. (Water cured protective tank lining for field application only)
National Pipe Coatings, Inc., Los Angeles, Calif.
Nebel Mfg. Co., Cleveland, O.
Nelson Mfg. Co., B. F., Minneapolis, Minn.
Nooter Corp., St. Louis, Mo. (Metal spray, lead burning alloy sheet)
Oakite Products, Inc., New York, N. Y.
Ohmlac Paint & Refining Co., Inc., New York, N. Y. (Acid resistant, heat resistant)
Penn Galvanizing Co., Philadelphia, Pa. (Galvanizing)
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.
Perolin Co., Inc., Chicago, Ill.
Pittsburgh Plate Glass Co., Pittsburgh, Pa. (Paint, varnish, lacquer)
Presstite Engineering Co., St. Louis, Mo.
Pyrolite Products Co., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Reilly Tar & Chemical Corp., Indianapolis, Ind. (Coal tar base)
● Ric-wiL Co., Cleveland, O.
Robertson Co., H. H., Pittsburgh, Pa.
Saverite Engineering Co., Hoboken, N. J. (Tank coatings, rust preventive)
Sonneborn Sons, Inc., L., New York, N. Y.
Southport Paint Co., Div. Wesson Oil & Snowdrift Co., Inc., Savannah, Ga. (Metallic paint)
Special Chemicals Corp., New York, N. Y. (Aluminum paint)
Tropical Paint & Oil Co., Cleveland, O.
Turco Products, Inc., Los Angeles, Calif.
United Chromium, Inc., New York, N. Y. (Chemical resisting organic coating)
United States Stoneware Co., New York, N. Y. (Corrosion resistant)
Watson-Standard Co., Pittsburgh, Pa.
Wilbur & Williams Co., Boston, Mass.
Wilhelm Co., A., Reading, Pa.
Wolfe-Kote Co., Inc., Sheboygan, Wis.
X-Pando Corp., Long Island City, N. Y. (Anti-corrosive)

COCKS, BOILER GAGE

Bordo Co., Inc., L. J., Glenside, Pa.
● Crane Co., Chicago, Ill.
Detroit Brass & Malleable Works, Detroit, Mich.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Keckley Co., O. C., Chicago, Ill.
Klingerit, Inc., New York, N. Y.
Lonergan Co., J. E., Philadelphia, Pa.
● Lunkenheimer Co., Cincinnati, O.
Marsh Corp., Jas P., Skokie, Ill.
Powell Co., Wm., The, Cincinnati, O.
Reliance Gauge Column Co., Cleveland, O.
Swift Lubricator Co., Elmira, N. Y.
Williams Gauge Co., The, Pittsburgh, Pa.
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.
Wright-Austin Co., Detroit, Mich.

COILS

See Surface, Cooling; Surface, Heating

COILS, CONDENSATION

● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
General Fittings Co., Providence, R. I.
Lewis & Co., Joseph E., Baltimore, Md.
Parker Appliance Co., The, Cleveland, O.
Yula Water Heaters, Inc., New York, N. Y.

COILS, FOR HOT WATER STORAGE TANKS

Adams Co., The, Dubuque, Ia.
American Cooling Tower Co., Kansas City, Mo.
● American District Steam Co., North Tonawanda, N. Y.
● Bell & Gossett Co., Morton Grove, Ill.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
● Davis Engineering Corp., Elizabeth, N. J.
Downingtown Iron Works, Downingtown, Pa.
● Doyle & Roth Mfg. Co., Brooklyn, N. Y.
Everhot Products Co., Chicago, Ill.
General-Fittings Co., Providence, R. I.
Howard Iron Works & Alberger Heater Div., Buffalo, N. Y.
Kold-Hold Mfg. Co., Lansing, Mich.
National Pipe Bending Co., New Haven, Conn.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Pedrick Tool & Machine Co., Philadelphia, Pa.
Pittsburgh Pipe Coil & Bending Co., Etna, Pa.
Roessing Mfg. Co., Pittsburgh, Pa.
Sales & Co., Murray W., Detroit, Mich.
Sims Co., Erie, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
Taco Heaters, Inc., Providence, R. I.
U. S. Pipe & Mfg. Co., San Francisco, Calif.
● Whitlock Mfg. Co., Hartford, Conn.
Yula Water Heaters, Inc., New York, N. Y.

COILS AND PANELS, RADIANT HEATING, PREFABRICATED

Atlantic Pipebending & Fabricating Corp., Edgewater, N. J.
Bradfield, Jos. L., Indianapolis, Ind. (headers)
Cannelton Sewer Pipe Co., RadianTile Div., Chicago, Ill. (Vitrified clay floor blocks and ducts for warm air)
Capitol Mfg. & Supply Co., Columbus, O.
Clow & Sons, James B., Chicago, Ill.
Cobra Pipe & Coil Co., Inc., Elmwood, Conn.
Crittall Radiant Heating, Inc., Richard, New York, N. Y.
Crotty Mfg. Corp., Long Island, N. Y.
Even-Ray Co., Inc., Newark, N. J.
● Kritzer Radiant Coils, Inc., Chicago, Ill.
Meco, Inc., Portland, Ore.
Pan-L-Heat Corp., Portland, Ore.
Pedrick Tool & Machine Co., Philadelphia, Pa.
Radiant Heat Sales Engrg. Co., Gary, Ind.
Simplex Ceiling Corp., New York, N. Y.

COILS, PIPE

● Acme Industries, Inc., Jackson, Mich.
American Cooling Towers Co., Kansas City, Mo.
Atlantic Pipebending & Fabricating Corp., Edgewater, N. J.
B & M Mfg. Co., East Orange, N. J.
Baker Refrigeration Corp., South Windham, Me.
Ball Welding Works, Inc., Oakland, Calif.

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Biggs Boiler Wks., Co., The, E. Akron, O.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Capitol Mfg. & Supply Co., Columbus, O.
Chicago Nipple Mfg. Co., Cicero, Ill.
Clow & Sons, James B., Chicago, Ill.
Cobra Pipe & Coil Co., Inc., Elmwood, Conn.
● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
● Crane Co., Chicago, Ill.
● Doyle & Roth Mfg. Co., Brooklyn, N. Y.
Ellsworth Pipe & Supply Co., Milwaukee, Wis.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y. (lead, lead covered, and lead alloy)
Flori Pipe Co., The, St. Louis, Mo.
● Frick Co., Waynesboro, Pa.
Harris & Co., Arthur, Chicago, Ill.
Kold-Hold Mfg. Co., Lansing, Mich.
Kopperman & Sons, Joseph, Philadelphia, Pa.
Lewis & Co., Joseph E., Baltimore, Md.
● Midwest Piping & Supply Co., Inc., St. Louis, Mo.
Mitchell & Co., Inc., W. K., Philadelphia, Pa.
Mueller Brass Co., Port Huron, Mich.
National Pipe Bending Co., New Haven, Conn.
Ohio Pipe Bending & Machine Co., Cleveland, O.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Pedrick Tool & Machine Co., Philadelphia, Pa.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Pittsburgh Pipe Coil & Bending Co., Etna, Pa.
Reco Products Div., Refrigeration Engineering Corp., Philadelphia, Pa.
Refrigeration Appliances, Inc., Chicago, Ill.
● Rempe Co., Chicago, Ill.
Reynolds Mfg. Co., Inc., Springfield, Mo.
Roessing Mfg. Co., Pittsburgh, Pa.
Sales & Co., Murray W., Detroit, Mich.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Shaw-Kendall Engineering Co., Toledo, O.
U. S. Pipe & Mfg. Co., San Francisco, Calif.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Vilter Mfg. Co., The, Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
● Whitlock Mfg. Co., Hartford, Conn.

COLLECTION, DUST AND FUME, ULTRASONIC

Supersonics Corp. of America, New York, N. Y.
Ultrasonic Corp., Cambridge, Mass.

COLLECTORS, DUST

Aerotec Corp., The, Greenwich, Conn.
Aget-Detroit Co., Ann Arbor, Mich.
Allen Billmyre Div., Lamson Corp., Syracuse, N. Y.
Allington & Curtis Mfg. Co., Saginaw, Mich. (centrifugal & bag)
● American Air Filter Co., Inc., Louisville, Ky.
● American Blower Corp., Detroit, Mich.
American Wheelabrator & Equipment Corp., Mishawaka, Ind.
Bargar Sheet Metal Co., Cleveland, O.
Blower Application Co., Milwaukee, Wis.
Bubar, Hudson H., Old Lyme, Conn.
● Buffalo Forge Co., Buffalo, N. Y.
Centri-Spray Corp., Detroit, Mich. (Wet type)
Chicago Blower Corp., Chicago, Ill. (centrifugal)
Cincinnati Electrical Tool Co., The, Cincinnati, O. (self contained)
Clark Dust Control Co., Chicago, Ill.
Columbian Steel Tank Co., Kansas City, Mo.
Day Co., The, Minneapolis, Minn.
Diamond Power Specialty Corp., Detroit, Mich.
Doall Co., The., Des Plaines, Ill.
Dust Filter Co., Chicago, Ill.
Dust Suppression & Engineering Co., Lake Orion, Mich.
Goethel Sheet Metal Wks., Alfred, Milwaukee, Wis.
Griffin & Co., Inc., Louisville, Ky.
Ideal Industries, Inc., Sycamore, Ill.
Indiana Fan Company, Indianapolis, Ind.
Jacobs Co., B. & J., Cincinnati, O.
Kirk & Blum Mfg. Co., Cincinnati, O.
Kluegel & Co., E., St. Paul, Minn.
Knickerbocker Co., Jackson, Mich.
Lumm Co., A. H., Toledo, O.
Newcomb-Detroit Co., Detroit, Mich. (recirculating water type)
Nooter Corp., St. Louis, Mo.
Northern Blower Co., Cleveland, O.
Pangborn Corp., Hagerstown, Md. (cloth filter)
Peters-Dalton, Inc., Detroit, Mich.
● Prat-Daniel Corp., East Port Chester, Conn.
Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
Research Corp., New York, N. Y.
Ruemelin Mfg. Co., Milwaukee, Wis.
St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Schmieg Industries, Detroit, Mich.
Schneible Co., Claude B., Detroit, Mich.
Sly Mfg. Co., W. W., Cleveland, O.
Spencer Turbine Co., Hartford, Conn.
Sprout-Waldron & Co., Muncy, Pa.
Thermix Corp., The, Greenwich, Conn.
Torit Mfg. Co., St. Paul, Minn.
Wagner Awning & Mfg. Co., Cleveland, O. (Dust recovery bags)
Western Blower Co., Seattle, Wash.
Western Precipitation Corp., Los Angeles, Calif.
Whiting Corp., Harvey, Ill.
Winkler & Sons, Inc., A. E., Milwaukee, Wis.
Young & Bertke Co., Cincinnati, O.

COLORIMETERS

Daigger & Co., A., Chicago, Ill.
Ellison Draft Gage Co., Chicago, Ill.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Photovolt Corp., New York, N. Y.
Refinite Corp., Omaha, Neb.
Tagliabue Corp., C. J., Newark, N. J.
Will Corp., Rochester, N. Y.

COMBUSTION CHAMBERS

See Chambers, Combustion, Preformed

COMBUSTION CONTROL

See Controls, Draft, Barometric; Regulators, Draft, Combustion; Systems, Combustion Control

COMBUSTION RECORDERS

See Recorders, Carbon Dioxide

COMPOUNDS, AIR FRESHENING

Air Correctives Inc., New York, N. Y.
Airkem, Inc., New York, N. Y.
Ampion Corp., Long Island City, N. Y.

COMPOUNDS, BOILER CLEANING

Acme Refining Co., The, Cleveland, O.
Agnew & Tomlinson, Long Island City, N. Y.
American Chemical Paint Co., Ambler, Pa.
American K. A. T. Corp., New York, N. Y.
Anderson-Stolz Corp., Kansas City, Mo.
Apex Engineering Co., Chicago, Ill.
Aquatic Chemical Laboratories, Inc., New York, N. Y.
Bird-Archer Co., Philadelphia, Pa.
Blue Seal Chemical Co., Roselle Park, N. J.
Cannon Chemical Co., Inc., Cambridge, Mass.
Chemical Engineering Co., Dallas, Tex.
Continental Products Co., Euclid, O.
Dearborn Chemical Co., Chicago, Ill.
Diamond Chemical Products, New York, N. Y.
Dowell Inc., Tulsa, Okla.
Ferro-Nil Corp., New York, N. Y.
Grief, Edward C., Bogota, N. J.
Haering & Co., Inc., D. W., Chicago, Ill.
Hagan Corp., Pittsburgh, Pa.
Hercules Chemical Co., Inc., New York, N. Y.
Hood Refining Co., Greensburg, Pa.
Houghton & Co., E. F., Philadelphia, Pa.
Kenite Laboratory, Inc., Madison, N. J.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Krehbiel Co., J. H., Chicago, Ill.
MacDermid Chemical Co., Bristol, Conn.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
North American Fibre Products Co., The, Cleveland, O.
O'Brien Industries, Jersey City, N. J.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.
Permatex Co., Inc., Brooklyn, N. Y.
Permutit Co., New York, N. Y.
Perolin Co., Inc., Chicago, Ill.
Radiator Specialty Co., Charlotte, N. C.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Saverite Engineering Co., Hoboken, N. J.
Sulflo, Inc., Elizabeth, N. J.
Turco Products, Inc., Los Angeles, Calif.
Utility Laboratory, Inc., Brooklyn, N. Y.
Vinco Co., Inc., The, New York, N. Y.
Water Service Laboratories, Inc., New York, N. Y.
Water Treatment Co. of America, Pittsburgh, Pa.
Western Chemical Co., Kansas City, Mo.
X Laboratories, Inc., New York, N. Y.

COMPOUNDS, BOILER AND RADIATOR SEALING

Ampion Corp., Long Island City, N. Y.
Atlas Chemical Co., Marietta, O.
Blue Seal Chemical Co., Roselle Park, N. J.
Cannon Chemical Co., Inc., Cambridge, Mass.
Chicago Specialty Mfg. Co., Chicago, Ill.
Dearborn Chemical Co., Chicago, Ill.
Desolvo Co., The, Pittsburgh, Pa.
Diamond Chemical Products, New York, N. Y.
Halowax Products Div., Union Carbide & Carbon Corp., New York, N. Y.
Hampton-Cross Co., The, Louisville, Ky.
Hercules Chemical Co., Inc., New York, N. Y.
Kenite Laboratory, Inc., Madison, N. J.
Krehbiel Co., J. H., Chicago, Ill.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
National Engineering Products, Inc., Washington, D. C.
Quigley Co., Inc., New York, N. Y.

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Radiator Specialty Co., Charlotte, N. C.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Star Products Co., New York, N. Y.
Sulflo, Inc., Elizabeth, N. J.
Utility Laboratory, Inc., Brooklyn, N. Y.
Vinco Co., Inc., The, New York, N. Y.
X Laboratories, Inc., New York, N. Y.

COMPOUNDS, CLEANING, AIR FILTER

Carbide and Carbon Chemicals Corp., Unit of Union Carbide and Carbon Corp., New York, N. Y.
National Aniline Div., Allied Chemical & Dye Corp., New York, N. Y.
Oakite Products, Inc., New York, N. Y.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.
Turco Products, Inc., Los Angeles, Calif.

COMPOUNDS, CLEANING, PIPE COIL AND CONDENSER

American Chemical Paint Co., Ambler, Pa.
Anderson-Stolz Corp., Kansas City, Mo.
Apex All Weather Products, Chicago, Ill.
Apex Engineering Co., Chicago, Ill.
Aquatic Chemical Laboratories, Inc., New York, N. Y.
Bird-Archer Co., Philadelphia, Pa.
Blue Seal Chemical Co., Roselle Park, N. J.
Cannon Chemical Co., Inc., Cambridge, Mass.
Carolina Aniline & Extract Co., Inc., Charlotte, N. C.
Chemical Engineering Co., Dallas, Tex.
Dearborn Chemical Co., Chicago, Ill.
Dowell, Inc., Tulsa, Okla.
Haering & Co., Inc., D. W., Chicago, Ill.
Hercules Chemical Co., Inc., New York, N. Y.
MacDermid Chemical Co., Bristol, Conn.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
North American Fibre Products Co., The, Cleveland, O.
Oakite Products, Inc., New York, N. Y.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.
Perolin Co., Inc., Chicago, Ill.
Radiator Specialty Co., Charlotte, N. C.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Turco Products, Inc., Los Angeles, Calif.
Utility Laboratory Inc., Brooklyn, N. Y.
Western Chemical Co., Kansas City, Mo.

COMPOUNDS, WELDING

Acme White Lead & Color Wks., Detroit, Mich.
Allen Co., Inc., L. B., Chicago, Ill.
Allied Weld-Craft, Inc., Indianapolis, Ind.
All-State Welding Alloys Co., Inc., White Plains, N. Y.
Aluminum Co. of America, Pittsburgh, Pa.
American Solder & Flux Co., Philadelphia, Pa.
Eutectic Welding Alloys Corp., New York, N. Y.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Marquette Mfg. Co., Minneapolis, Minn.
Midland Paint & Varnish Co., Cleveland, O.
Neilson Chemical Co., Detroit, Mich.
Powder Weld Process Co., The, Brooklyn, N. Y. (Powdered)
Presstite Engineering Co., St. Louis, Mo.
Sight Feed Generator Co., West Alexandria, O.
Special Chemicals Corp., New York, N. Y.
Thompson & Co., Oakmont, Pa.
Turco Products, Inc., Los Angeles, Calif.
Wolfe-Kote Co., Inc., Sheboygan, Wis.

COMPRESSOR BASES

See Bases and Pads, Vibration Isolating

COMPRESSORS, AIR

Allen Billmyre Div., Lamson Corp., Syracuse, N. Y.
● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Beach-Russ Co., New York, N. Y.
Binks Mfg. Co., Chicago, Ill.
● Brunner Mfg. Co., Utica, N. Y.
Bury Compressor Co., Erie, Pa.
Chicago Pneumatic Tool Co., New York, N. Y.
Cooper-Bessemer Corp., Mt. Vernon, O.
Cooper Co., Clark, Palmyra, N. J.
● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Davey Compressor Co., Kent, O.
Dayton Air Compressor Co., Dayton, O.
DeVilbiss Co., The, Toledo, O.
Electric Sprayit Co., The, Sheboygan, Wis.
Essick Mfg. Co., Los Angeles, Calif.
Fuller Co., Catasaqua, Pa.
Gardner-Denver Co., Quincy, Ill.
Gilbert & Barker Mfg. Co., West Springfield, Mass.
Hobart Bros. Co., Troy, O.
Ingersoll-Rand Co., New York, N. Y.
● Joy Mfg. Co., Pittsburgh, Pa.
Lammert & Mann Co., Chicago, Ill.
Lynch Corp., Toledo, O.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
● Nash Engineering Co., South Norwalk, Conn.
North Penn Co., New York, N. Y.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Roots-Connersville Blower Corp., Connersville, Ind.
Schramm, Inc., West Chester, Pa.
Spencer Turbine Co., Hartford, Conn.
Trimount Rotary Power Co., Dedham, Mass.
Uniflow Mfg. Co., Erie, Pa.
Union Steam Pump Co., Battle Creek, Mich.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
● Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Worthington Pump & Machinery Corp., Harrison, N. J.
Yeomans Bros. Co., Chicago, Ill.

COMPRESSORS, REFRIGERATING, CENTRIFUGAL

● Carrier Corp., Syracuse, N. Y. (Carrene)
DeLaval Steam Turbine Co., Trenton, N. J. (Water vapor)
● Trane Co., The, LaCrosse, Wis.
● Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
● York Corp., York, Pa.

COMPRESSORS, REFRIGERATING, COMBINED WITH CONDENSER, WATER CHILLER, PIPING CONNECTIONS, AND CONTROLS

● Doyle & Roth Mfg. Co., Brooklyn, N. Y.

COMPRESSORS, REFRIGERATING, RECIPROCATING

Airtemp, Div. of Chrysler Corp., Dayton, O. (Radial)
Baker Refrigeration Corp., South Windham, Me. ("Freon," Methyl chloride, Ammonia)
● Brunner Mfg. Co., Utica, N. Y. (Methyl chloride, "Freon," sulphur dioxide)
● Carrier Corp., Syracuse, N. Y. ("Freon")
Controldtemp Equipment Sales Corp., Brooklyn, N. Y.
Copeland Refrigeration Corp., Sidney, O.
● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Diceler Div. of General Machine & Mfg. Co., Berwick, Pa.
● Frick Co., Waynesboro, Pa. (Ammonia, "Freon")
Frigidaire Div., General Motors Corp., Dayton, O.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Machinery Co., Spokane, Wash.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
● Howe Ice Machine Co., Chicago, Ill. ("Freon," ammonia, methyl chloride)
Ingersoll-Rand Co., New York, N. Y.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kelvinator Div., Nash-Kelvinator Corp., Detroit, Mich.
Lehigh Mfg. Co., Div. of Lehigh Foundries, Inc., Lancaster, Pa.
Liberty Motors & Engineering Corp., Baltimore, Md.
Lynch Corp., Toledo, O.
Mills Industries, Inc., Chicago, Ill.
Ready-Power Co., The, Detroit, Mich. (radial unit driven by direct-connected internal combustion engine)
Reliance Refrigerating Machine Co., Chicago, Ill. ("Freon," methyl chloride, ammonia)
Reynolds Mfg. Co., Inc., Springfield, Mo.
Schnacke, Inc., Evansville, Ind.
Servel, Inc., Electric Refrigeration Div., Evansville, Ind. ("Freon")
Starr Piano Co., Richmond, Ind.
Stewart Ice Machine Co., Pomona, Calif.
Tecumseh Products Co., Tecumseh, Mich.
● Trane Co., The, LaCrosse, Wis.
Universal Cooler Div. of Newport Steel Corp., Marion, O. ("Freon")
Vilter Mfg. Co., Milwaukee, Wis. ("Freon" ammonia)
● Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Wittenmeier Machinery Co., Chicago, Ill. (Carbon dioxide)
Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill. (Ammonia, methyl chloride)
● York Corp., York, Pa. (Carbon dioxide, ammonia, "Freon")

COMPRESSORS, REFRIGERATING, STEAM JET

● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Croll-Reynolds Engrg. Co., Inc., New York, N. Y.
Elliott Co., Jeannette, Pa.
Graham Mfg. Co., Inc., New York, N. Y.
Ingersoll-Rand Co., New York, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
● Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.

COMPRESSORS, STEAM BOOSTER

Blackburn-Smith Mfg. Co., Hoboken, N. J.
Bury Compressor Co., Erie, Pa.

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Graham Mfg. Co., Inc., New York, N. Y.
Ingersoll-Rand Co., New York, N. Y
Pennsylvania Pump & Compressor Co., Easton, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Worthington Pump & Machinery Corp., Harrison, N. J.

CONCRETE, INSULATING, FOR UNDERGROUND PIPING

● Zonolite Co., Chicago, Ill.

CONDENSATE DISPOSAL UNITS

See Units, Condensate Disposal

CONDENSATE RETURN

See Pumps, Condensation Return; Systems, Condensate Return

CONDENSATION METERS

See Meters, Condensation

CONDENSATION PUMPS

See Pumps, Condensation

CONDENSER TUBES

See Tubes, Condenser

CONDENSERS, REFRIGERATING, EVAPORATIVE

● Acme Industries, Inc., Jackson, Mich.
● American Blower Corp., Detroit, Mich.
American Coils Co., Newark, N. J.
American Cooling Tower Co., Kansas City, Mo.
Baker Refrigeration Corp., South Windham, Me.
● Baltimore Aircoil Co., Inc., Baltimore, Md.
Betz Corp., Hammond, Ind.
● Buffalo Forge Co., Buffalo, N. Y.
● Bush Mfg. Co., West Hartford Conn.
● Carrier Corp., Syracuse, N. Y. ("Freon," ammonia)
● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
● Doyle & Roth Mfg. Co., Brooklyn, N. Y.
Drayer & Hanson, Inc., Los Angeles, Calif.
● Frick Co., Waynesboro, Pa.
Frigidaire Div., General Motors Corp., Dayton, O.
● G & O Mfg. Co., New Haven, Conn.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
● Governair Corp., Oklahoma City, Okla.
Harry Cooling Towers, Inc., New York, N. Y.
● Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Atlanta, Ga.
Long Mfg. Div. Borg-Warner Corp., Detroit, Mich.
● Marlo Coil Co., St. Louis, Mo.
● Murray Mfg. Co., D. J., Wausau, Wis.
● Niagara Blower Co., New York, N. Y.
Peerless of America, Inc., Chicago, Ill.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
Ristow, R. E., Los Angeles, Calif.
Schnacke, Inc., Evansville, Ind.
Temp-Control Inc., Peoria, Ill.
● Trane Co., The, LaCrosse, Wis.
● Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
● United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
● Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
XL Refrigerating Co., Chicago, Ill.
Yates-American Machine Co., Beloit, Wis.
● York Corp., York, Pa.
● Young Radiator Co., Racine, Wis.

CONDENSERS, REFRIGERATING, SHELL AND COIL

● Acme Industries, Inc., Jackson, Mich.
American Coils Co., Newark, N. J.
Armstrong Co., Richard M., Westchester, Pa.
Baker Refrigeration Corp., South Windham, Me.
Ball Welding Works, Inc., Oakland, Calif.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Brown Fintube Co., The, Elyria, O.
● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
● Davis Engineering Corp., Elizabeth, N. J.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
● Doyle & Roth Mfg. Co., Brooklyn, N. Y.
General Fittings Co., Providence, R. I.
Halstead & Mitchell, Pittsburgh, Pa. (Double tube)
Heat-X-Changer Co., Inc., The, Brewster, N. Y.
● Howe Ice Machine Co., Chicago, Ill.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Nooter Corp., St. Louis, Mo.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Reco Products Div., Refrigeration Engineering Corp., Philadelphia, Pa.
Refrigeration Economics Co., Inc., Canton, O.
Rome-Turney Radiator Co., Rome, N. Y.
● Trane Co., The, La Crosse, Wis.
● Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
Vilter Mfg. Co., Milwaukee, Wis.
● Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
● Whitlock Mfg. Co., Hartford, Conn.
X L Refrigerating Co., Chicago, Ill.
● York Corp., York, Pa.
● Young Radiator Co., Racine, Wis.

CONDENSERS, REFRIGERATING, SHELL AND TUBE

● Acme Industries, Inc., Jackson, Mich.
Airtemp, Div. of Chrysler Corp., Dayton, O.
● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Coils Co., Newark, N. J.
Andale Co., Philadelphia, Pa.
Armstrong Co., Richard M., Westchester, Pa.
Baker Refrigeration Corp., South Windham, Me.
Ball Welding Works, Inc., Oakland, Calif.
● Bell & Gossett Co., Morton Grove, Ill.
Biggs Boiler Works Co., E., Akron, O.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Brown Fintube Co., The, Elyria, O.
● Carrier Corp., Syracuse, N. Y. (Carrene)
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
● Davis Engineering Corp., Elizabeth, N. J.
Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., Pittsburgh, Pa.
● Doyle & Roth Mfg. Co., Brooklyn, N. Y.
● Frick Co., Waynesboro, Pa.
General Electric Co., Air Conditioning Dept., Bloomfield, N .J.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Heat Transfer Products, Inc., Carbondale, Pa.
Howard Iron Works & Alberger Heater Div., Buffalo, N. Y,
● Howe Ice Machine Co., Chicago, Ill.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Kramer Trenton Co., Trenton, N. J.
National Radiator Co., The, Johnstown, Pa.
Nooter Corp., St. Louis, Mo.
Ohio Pipe Bending & Machine Co., Cleveland, O.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Reco Products Div., Refrigeration Engineering Corp., Philadelphia, Pa
Refrigeration Economics Co., Inc., Canton, O.
Reliance Refrigerating Machine Co., Chicago, Ill.
Reynolds Mfg. Co., Inc., Springfield, Mo.
Richmond Engrg. Co., Inc., Richmond, Va.
Roessing Mfg. Co., Pittsburgh, Pa.
Rome-Turney Radiator Co., Rome, N. Y.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Schnacke, Inc., Evansville, Ind.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
Stewart Ice Machine Co., Pomona, Calif.
● Trane Co., The, LaCrosse, Wis.
● Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
Union Steam Pump Co., Battle Creek, Mich.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
● Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
● Whitlock Mfg. Co., Hartford, Conn.
Wittenmeier Machinery Co., Chicago, Ill.
Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
● York Corp, York, Pa.
● Young Radiator Co., Racine, Wis.

CONDENSERS, WATER DISTRIBUTORS FOR

See Distributors, Water, for Condensers

CONDENSING UNITS

See Compressors

CONDUCTORS AND PANELS, ELECTRICAL, FOR RADIANT HEATING

Appleman Glass Works, Bergenfield, N. J.
Continental Radiant Glass Heat Corp., New York, N. Y.
Crittall Radiant Heating, Inc., Richard, New York, N. Y.
Electradiant Corp., Monterey, Calif.
Roberson Co., L. N., Seattle, Wash.
United States Rubber Co., New York, N. Y.

CONDUIT, UNDERGROUND PIPING

● American District Steam Co., North Tonawanda, N. Y.
Byers Co., A. M., Pittsburgh, Pa. (Wrought iron)
Dockstader, Inc., S. E., Washington, D. C.
● Durant Insulated Pipe Co., Palo Alto, Calif.

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Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Johns-Manville, New York, N. Y.
Kaiser Co., E. B., Chicago, Ill.
Michigan Pipe Co., Bay City, Mich.
Orangeburg Mfg. Co., Orangeburg, N. Y.
● Porter & Co., Inc., H. W., Newark, N. J.
● Ric-wiL Co., Cleveland, O.
● Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Stillwater Clay Products Co., The, Cleveland, O.

CONNECTIONS, DUCT, FLEXIBLE (ASBESTOS, CANVAS, ETC.)

Canvas Products Co., St. Louis, Mo.
Chicago Metal Hose Corp., Maywood, Ill.
Felters Company, The, Boston, Mass.
Grant Wilson Inc., Chicago, Ill.
Iden Mfg. Co., Chicago, Ill.
● Polyken Industrial Tape Dept., Bauer & Black, Div. of the Kendall Co., Chicago, Ill.
St. Clair Rubber Co., Detroit, Mich.
United States Rubber Co., New York, N. Y.
Wagner Awning & Mfg. Co., Cleveland, O.

CONNECTORS, FILLING, HYDROSTATIC TEST

Mechanical Products Corp., Chicago, Ill.
Roylyn, Inc., Glendale, Calif.

CONNECTORS, FOR NON-METALLIC DUCT FABRICATION

Acme Steel Co., Chicago, Ill. (Strapping)
Klomparens Lock-Joint Mfg. Co., Inc., Washington, D. C.
Lumm Co., A. H., Toledo, O.
Sheetlock Co., Chicago, Ill.
United States Rubber Co., New York, N. Y.

CONTINUOUS HEATERS

See Heaters, Steam Jet, for Liquids

CONTROL, FOR INDIRECT WATER HEATERS

Armstrong Control Co., Inc., Portland, Ore.
Barber-Colman Co., Rockford, Ill.
● Bell & Gossett Co., Morton Grove, Ill.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
● Detroit Lubricator Co., Detroit, Mich.
Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.
● Hoffman Specialty Co., Indianapolis, Ind.
Klipfel Valves, Inc., Div. of Hamilton-Thomas Corp., Hamilton, O.
● Mercoid Corp., The, Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
Taco Heaters, Inc., Providence, R. I.
● Thrush & Co., H. A., Peru, Ind.
Watts Regulator Co., Lawrence, Mass.

CONTROL SYSTEMS, PRE-ASSEMBLED AS UNITS, FOR HEATING, COOLING AND VENTILATING

Factory Assemblies Using Other Manufacturers' Valves, Thermostats, Damper Motors, etc.

Midwest Automatic Control Co., Des Moines, Ia.

CONTROLLERS AND STARTERS, MOTOR

● Allen-Bradley Co., Milwaukee, Wis.
● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Arrow-Hart & Hegeman Elec. Co., Hartford, Conn.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
B/W Controller Corp., Birmingham, Mich.
Borg-Erickson Corp., Chicago, Ill.
Chase-Shawmut Co., Newburyport, Mass.
Clark Controller Co., Cleveland, O.
Cutler-Hammer, Inc., Milwaukee, Wis.
Electric Controller & Mfg. Co., Cleveland, O.
Electric Machinery Mfg. Co., Minneapolis, Minn. (Synchronous motor)
Fitch, Allen & Co., Chicago, Ill.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Guardian Electric Mfg. Co., Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Monitor Controller Co., The, Boston, Mass.
Penn Electric Switch Co., Goshen, Ind.
Redmond Co., Inc., Owosso, Mich.
Reynolds Electric Co., River Grove, Ill.
Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Trumbull Electric Mfg. Co., The, Plainville, Conn.
● Ward Leonard Electric Co., Mt. Vernon, N. Y.
● Westinghouse Electric Corp., Pittsburgh, Pa.
Zenith Electric Co., Chicago, Ill.

CONTROLS, AIR CONDITIONING

See Humidistats; Indicator-Controllers; Operators, Damper; Operators, Valve; Recorder-Controllers; Regulators; Relays; Switches; Thermostats; Valves, Diaphragm; Valves, Refrigeration; Valves, Solenoid

CONTROLS, DOOR, ELECTRIC EYE (FOR AIR CONDITIONED ROOMS)

Ess Specialty Corp., Bergenfield, N. J.
Furst Electronics, Chicago, Ill.
Stanley Works, The, New Britain, Conn.
● Westinghouse Electric Corp., Pittsburgh, Pa.
Yale & Towne Mfg. Co., Stamford, Conn.

CONTROLS, DRAFT, BAROMETRIC

Atlas Utilities Co., Inc., Providence, R. I.
Automatic Products Co., Milwaukee, Wis.
Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Campbell Engineering Co., Appleton, Wis.
Cleveland Fuel Equipment Co., Cleveland, O.
Cole-Sewell Engineering Co., St. Paul, Minn.
Empire Ventilation Equipment Co., Long Island City, N. Y.
Field Control Div., H. D. Conkey & Co., Mendota, Ill.
Fuelguard Co., Dallas, Tex.
Hotstream Heater Co., Cleveland, O.
Krueger Sentry Gauge Co., Green Bay, Wis.
Perfex Corp., Milwaukee, Wis.
Preferred Utilities Mfg. Corp., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
Simplex Mfg. Co., Fond du Lac, Wis.
Skuttle Mfg. Co., Detroit, Mich.
United States Radiator Corp., Detroit, Mich.

CONTROLS, FIRE PROTECTION SPRINKLER SYSTEMS

American District Telegraph Co., New York, N. Y.
● Automatic Products Co., Milwaukee, Wis.
Barber-Colman Co., Rockford, Ill.
Clark Controller Co., Cleveland, O.
Cook Electric Co., Diaphlex Div., Chicago, Ill.
● Grinnell Co., Inc., Providence, R. I.
Raisler Corp., Grimes Sprinkler Div., New York, N. Y.
Rockwood Sprinkler Co., Worcester, Mass.
Synchro-Start Products, Inc., Chicago, Ill.
Worner Electronic Devices, Rankin, Ill.

CONTROLS, FLAME FAILURE

American District Telegraph Co., New York, N. Y.
Bristol Co., The, Waterbury, Conn.
Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
● Combustion Control Corp., Cambridge, Mass.
Drying Systems, Inc., Chicago, Ill.
Ess Specialty Corp., Bergenfield, N. J.
Fuelguard Co., Dallas, Tex.
Furst Electronics, Chicago, Ill.
● General Controls Co., Glendale, Calif.
General Electric Co. Apparatus Dept., Schenectady, N. Y.
General Power Plant Corp., New York, N. Y.
● Haney Gas Burner & Engrs., Monrovia, Calif.
● Mercoid Corp., The, Chicago, Ill.
● Mettler Co., Lee B., Los Angeles, Calif.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
● Webster Engineering Co., Tulsa, Okla.
Wheelco Instruments Co., Chicago, Ill.
White Mfg. Co., St. Paul, Minn.
● White-Rodgers Electric Co., St. Louis, Mo.

CONTROLS, HEATING

See Alarms; Humidistats; Indicator-Controllers; Operators, Damper; Operators, Valve; Recorder-Controllers; Regulators; Relays; Switches; Systems, Combustion Control; Systems, Heating; Thermostats; Valves, Balancing, Radiator; Valves, Diaphragm; Valves, Flow Control; Valves, Mixing; Valves, Pressure Reducing and Regulating; Valves, Radiator; Valves, Solenoid

CONTROLS, PUSH-PULL

See Shafts, Flexible, Push-Pull, for Control

CONTROLS, REFRIGERATION

See Humidistats; Operators, Valve; Relays; Switches; Thermostats; Valves, Refrigeration; Valves, Solenoid

● Advertisement in this issue. See Index to Advertisers, page 120d

CONVECTORS

See Radiation, Convection Type

CONVEYORS, COAL AND ASH

Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Chain Belt Co., Milwaukee, Wis.
Chicago Fire Brick Co., Chicago, Ill.
CraneVeyor Corp., Los Angeles, Calif.
Farquhar Co., A. B., York, Pa.
Hager Bros., Rockford, Ill.
Jeffrey Mfg. Co., Columbus, O.
● Joy Mfg. Co., Pittsburgh, Pa.
Link-Belt Co., Chicago, Ill.
Sprout, Waldron & Co., Muncy, Pa.
Standard Transmission Equipment Co., Pasadena, Calif.
● Stephens-Adamson Mfg. Co., Aurora, Ill.

COOLERS, CRANE CAB

Dravo Corp., Pittsburgh, Pa.
● Trane Co., The, LaCrosse, Wis.

COOLERS, OIL

American Cooling Tower Co., Kansas City, Mo.
● American District Steam Co., North Tonawanda, N. Y.
American Locomotive Co., Alco Products Div., New York, N. Y.
Andale Co., Philadelphia, Pa.
Armstrong Co., Richard M., Westchester, Pa.
● Bell & Gossett Co., Morton Grove, Ill.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Brown Fintube Co., The, Elyria, O.
Clifford Mfg. Co., Div. of Standard-Thomson Corp., Waltham, Mass.
● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
● Davis Engineering Corp., Elizabeth, N. J.
Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., Pittsburgh, Pa.
Downingtown Iron Works, Downingtown, Pa.
● Doyle & Roth Mfg. Co., Brooklyn, N. Y.
Fluor Corp., Ltd., The, Los Angeles, Calif.
● G & O Mfg. Co., New Haven, Conn.
Gilbert Brass Foundry Co., St. Louis, Mo.
Graham Mfg. Co., Inc., New York, N. Y.
Griscom-Russell Co., The, New York, N. Y.
Halstead & Mitchell, Pittsburgh, Pa.
Howard Iron Works & Alberger Heater Div., Buffalo, N. Y.
Kold-Hold Mfg. Co., Lansing, Mich.
● Marlo Coil Co., St. Louis, Mo.
● Modine Mfg. Co., Racine, Wis.
● Murray Mfg. Co., D. J., Wausau, Wis.
National Pipe Bending Co., New Haven, Conn.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Perfex Corp., Milwaukee, Wis.
Refrigeration Economics Co., Inc., Canton, O.
Rome-Turney Radiator Co., Rome, N. Y.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
Sims Co., Erie, Pa.
Struthers Wells Corp., Titusville, Pa.
Taco Heaters, Inc., Providence, R. I.
Temprite Products Corp., Detroit, Mich.
● Trane Co., The, LaCrosse, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
● Whitlock Mfg. Co., Hartford, Conn.
Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
● York Corp., York, Pa.
● Young Radiator Co., Racine, Wis.

COOLERS, UNIT (FLOOR TYPE)

Not air conditioning units, but floor mounted unit with coil and centrifugal fans without filters, for connection to remote compressor or cold water supply. For air conditioning units see Units, Air Conditioning

● Acme Industries, Inc., Jackson, Mich.
● American Blower Corp., Detroit, Mich.
Baker Refrigeration Corp., South Windham, Me.
● Baltimore Aircoil Co., Inc., Baltimore, Md.
● Buffalo Forge Co., Buffalo, N. Y.
● Bush Mfg. Co., West Hartford, Conn.
● Carrier Corp., Syracuse, N. Y.
Conditionaire Unit Co., Chicago, Ill.
● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
● Doyle & Roth Mfg. Co., Brooklyn, N. Y.
Drayer & Hanson, Inc., Los Angeles, Calif.
Economy Equipment Co., Chicago, Ill.
● Frick Co., Waynesboro, Pa.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
● Governair Corp., Oklahoma City, Okla.
● Howe Ice Machine Co., Chicago, Ill.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
● Kennard Corp., St. Louis, Mo.
Larkin Coils, Atlanta, Ga.
● Marlo Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
● Murray Mfg. Co., D. J., Wausau, Wis.
● Niagara Blower Co., New York, N. Y.
Peerless of America, Inc., Chicago, Ill.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
Rigidbilt Inc., Chicago, Ill.
Rinehart Inc., Richmond, Ind.
St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Temp-Control Inc., Peoria, Ill.
Tenney Engineering, Inc., Newark, N. J.
● Trane Co., The, La Crosse, Wis.
● Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
● United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
● Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
● York Corp., York, Pa.
● Young Radiator Co., Racine, Wis.

COOLERS, UNIT (SUSPENDED TYPE)

Not air conditioning units, but suspended unit with coil and propeller fan, without filters, for connection to remote compressor or cold water supply. For air conditioning units, see Units, Air Conditioning

● American Blower Corp., Detroit, Mich.
American Coils Co., Newark, N. J.
American Cooling Tower Co., Kansas City, Mo.
Auburn Burner Co., Auburn, Ind.
Baker Refrigeration Corp., South Windham, Me.
Betz Corp., Hammond, Ind.
● Buffalo Forge Co., Buffalo, N. Y.
● Bush Mfg. Co., West Hartford, Conn.
Campbell Heating Co., E. K., Kansas City, Mo.
● Carrier Corp., Syracuse, N. Y.
Conditionaire Unit Co., Chicago, Ill.
● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
● Doyle & Roth Mfg. Co., Brooklyn, N. Y.
Drayer & Hanson, Inc., Los Angeles, Calif.
Economy Equipment Co., Chicago, Ill.
● Fedders-Quigan Corp., Buffalo, N. Y.
Frigidaire Div., General Motors Corp., Dayton, O.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
● Governair Corp., Oklahoma City, Okla.
● Howe Ice Machine Co., Chicago, Ill.
Ilg Electric Ventilating Co., Chicago, Ill.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
● Kennard Corp., St. Louis, Mo.
● King Co., The, Owatonna, Minn.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Atlanta, Ga.
● Marlo Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
Merchant & Evans Co., Philadelphia, Pa.
● Murray Mfg. Co., D. J., Wausau, Wis.
● Niagara Blower Co., New York, N. Y.
Peerless of America, Inc., Chicago, Ill.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
● Rempe Co., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.
Rinehart Inc., Richmond, Ind.
St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Tenney Engineering, Inc., Newark, N. J.
Thermal Co., Inc., Milwaukee, Wis.
● Trane Co., The, La Crosse, Wis.
● United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
● Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Wilson Engineering Corp., Chicago, Ill.
● Wing Mfg. Co., L. J., New York, N. Y.
Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
● York Corp., York, Pa.

COOLING COILS

See Surface, Cooling

COOLING SURFACE

See Surface, Cooling

COOLING TOWERS

See Towers, Cooling

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COOLING UNITS
See Units, Air Conditioning; Coolers, Unit

COPPER PIPE
See Pipe, Brass and Copper

COPPER SHEETS
See Sheets, Copper

COPPER TUBE FITTINGS
See Fittings, Copper Tube

COPPER TUBE FITTINGS, FLARED
See Fittings, Copper Tube, Flared

COPPER TUBING
See Tubing, Brass and Copper

CORROSION PREVENTIVES
See Devices, Electrolytic, for Preventing Corrosion; Treatment, Steam System, to Inhibit Corrosion; and Treatment, Water, to Inhibit Corrosion

COUNTERS, DUST
Bausch & Lomb Optical Co., Rochester, N. Y.
Hill, E. Vernon & Co., Chicago, Ill.
Mine Safety Appliances Co., Pittsburgh, Pa.
Service to Industry, West Hartford, Conn.
Willson Products, Inc., Reading, Pa.

COUPLINGS, FLEXIBLE, POWER TRANSMISSION
Ajax Flexible Coupling Co., Westfield, N. Y.
American Flexible Coupling Co., Erie, Pa.
Automatic Steel Products Inc., Canton, O. (automatic centrifugal clutch)
Blood Brothers Machine Co., Allegan, Mich. (Universal joints)
Boston Gear Wks., Inc., North Quincy, Mass.
Brooks Equipment Corp., Hoboken, N. J.
Browning Mfg. Co., Inc., Maysville, Ky.
Caldwell Co., W. E., Louisville, Ky.
Central Die Casting & Mfg. Co., Inc., Chicago, Ill.
Certified Flexible Couplings, New York, N. Y.
Chain Belt Co., Milwaukee, Wis.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Congress Drives Div., Tann Corp., Detroit, Mich.
Crocker-Wheeler Div. Elliott Co., Ampere, N. J.
Davidson Co., M. T., Brooklyn, N. Y.
De Laval Steam Turbine Co., Trenton, N. J.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Falk Corp., Milwaukee, Wis.
Guardian Products Corp., Michigan City, Ind.
Irving Flexible Coupling Co., Inc., Los Angeles, Calif.
Jeffrey Mfg. Co., Columbus, O.
Jones Foundry & Machine Co., W. A., Chicago, Ill.
Koppers Co., Inc., Pittsburgh, Pa.
Link-Belt Co., Indianapolis, Ind.
Lord Mfg. Co., Erie, Pa.
Lovejoy Flexible Coupling Co., Chicago, Ill.
Medart Co., St. Louis, Mo.
Morse Chain Co., Detroit, Mich.
● Nicholson & Co., W. H., Wilkes-Barre, Pa.
Philadelphia Gear Works, Inc., Philadelphia, Pa.
Piezo Mfg. Corp., New York, N. Y.
Poole Foundry & Machine Co., Baltimore, Md.
Ramsey Chain Co., Inc., Albany, N. Y.
Royersford Foundry & Machine Co., Inc., Royersford, Pa.
Shallcross Co., Philadelphia, Pa.
Smith & Serrell, Inc., Newark, N. J.
Sprout, Waldron & Co., Muncy, Pa.
Stow Mfg. Co., Binghamton, N. Y.
Thermoid Co., Trenton, N. J.
United States Rubber Co., New York, N. Y.
Waldron Corp., John, New Brunswick, N. J.
● Westinghouse Electric Corp., Pittsburgh, Pa.
Whitney Chain & Mfg. Co., The, Hartford, Conn.
Wood's Sons Co., T. B., Chambersburg, Pa.

COUPLINGS, PIPE
Aeroquip Corp., Jackson, Mich.
Alabama Pipe Co., Anniston, Ala. (Cast iron)
Byers Co., A. M., Pittsburgh, Pa. (Wrought iron)
Capitol Mfg. & Supply Co., Columbus, O.
Champion Machine & Forging Co., Cleveland, O.
Chase Brass & Copper Co., Waterbury, Conn.
Clow & Sons, James B., Chicago, Ill.
Continental-Diamond Fibre Co., Newark, Del.
Cooper Alloy Foundry Co., The, Hillside, N. J.
● Crane Co., Chicago, Ill.
Detroit Brass & Malleable Works, Detroit, Mich.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Drinkwater, Inc., Waukegan, Ill.
Fischer & Porter Co., Hatboro, Pa. (glass)
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Flori Pipe Co., The, St. Louis, Mo.
Grabler Mfg. Co., Cleveland, O.
● Grinnell Co., Inc., Providence, R. I.
Gustin Bacon Mfg. Co., Kansas City, Mo.
Harrisburg Steel Corp., Harrisburg, Pa.
Hinderliter Tool Co., The. Div. of the H. K. Porter Co., Inc., Tulsa, Okla.
Illinois Malleable Iron Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
King Union Co., Inc., Hillsgrove, R. I.
Malleable Iron Fittings Co., Branford, Conn.
Morris Coupling & Clamp Co., Ellwood City, Pa.
Mueller Brass Co., Port Huron, Mich.
National Tube Co., United States Steel Corp. Sub., Pittsburgh, Pa.
Parker Appliance Co., The, Cleveland, O.
Pittsburgh Steel Co., Pittsburgh, Pa.
Pittsburgh Valve & Fittings Co., Barberton, O.
Rhode Island Fittings Co., Providence, R. I.
Semler Co., Jeannette, Pa.
Stockham Valves & Fittings, Birmingham, Ala.
Stokes Molded Products, Inc., Trenton, N. J. (Hard rubber)
Union Metal Works, Chelsea, Mass.
United States Stoneware Co., New York, N. Y.
Victaulic Co. of America, New York, N. Y.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
● Watson-Stillman Co., Roselle, N. J.
Wheeling Machine Products Co., Wheeling, W. Va.
● Youngstown Sheet & Tube Co., Youngstown, O.

COUPLINGS, PIPE, DETACHABLE
Aeroquip Corp., Jackson, Mich.
Drinkwater, Inc., Waukegan, Ill.
Gates Engineering Co., Wilmington, Del.
Hinderliter Tool Co., The, Div. of the H. K. Porter Co., Inc., Tulsa, Okla.
Morris Coupling & Clamp Co., Ellwood City, Pa.
Packless Metal Products Corp., New Rochelle, N. Y.
Roylyn, Inc., Glendale, Calif.
Victaulic Co. of America, New York, N. Y.
Wiggins Oil Tool Co., Inc., E. B., Los Angeles, Calif.

CRANE CAB COOLERS
See Coolers, Crane Cab

CUT-OFFS, LOW WATER, HEATING BOILER
B/W Controller Corp., Birmingham, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
● General Controls Co., Glendale, Calif.
Johnson Corp., The, Three Rivers, Mich.
Magnetrol, Inc., Chicago, Ill.
● Maid-O'-Mist, Inc., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
● Mercoid Corp., The, Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Newark Boiler Regulator Co., Inc., Bloomfield, N. J.
Penn Electric Switch Co., Goshen, Ind.
Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
Watts Regulator Co., Lawrence, Mass.
● Webster & Co., Warren, Camden, N. J.

CUTTERS, PIPE
American Pipe Tool Co., Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Armstrong Mfg. Co., Bridgeport, Conn.
Atkins & Co., E. C., Indianapolis, Ind.
Barnes Tool Co., The, New Haven, Conn.
Beaver Pipe Tools, Inc., Warren, O.
Berns Co., Otto, Rochester, N. Y.
Continental Machine Co., Chicago, Ill.
Crown Die & Tool Co., Chicago, Ill.
Erie Tool Works, Erie, Pa.
Hollands Mfg. Co., Erie, Pa.
International Nutyp Tool Co., Oswego, N. Y.
Landis Machine Co., Inc., Waynesboro, Pa.
M-M-A, Inc., Lancaster, Pa.
Nye Tool Co., Chicago, Ill.
Oster Mfg. Co., Cleveland, O.
Quijada Tool Co., Inc., Los Angeles, Calif.
● Ridge Tool Co., Elyria, O.
Sac Tool Mfg. Co., St. Louis, Mo.
Toledo Pipe Threading Machine Co., Toledo, O.
Trimont Mfg. Co., Div. of Aetna Industrial Corp., Boston, Mass.
V-Mac Industries, Guilford, Conn.

CUTTERS, TUBING
Armstrong Bros. Tool Co., Chicago, Ill.
Armstrong Mfg. Co., Bridgeport, Conn.

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Beaver Pipe Tools, Inc., Warren, O.
Bernz Co., Otto, Rochester, N. Y.
● Bonney Forge & Tool Works, Allentown, Pa.
Continental Machine Co., Chicago, Ill.
● Couplings Co., Chicago, Ill.
Duro Metal Products Co., Chicago, Ill.
Everhot Products Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Landis Machine Co., Inc., Waynesboro, Pa.
Mueller Brass Co., Port Huron, Mich.
Nye Tool Co., Chicago, Ill.
Parker Appliance Co., The, Cleveland, O.
Penn Brass & Copper Co., Erie, Pa.
Quijada Tool Co., Inc., Los Angeles, Calif.
● Ridge Tool Co., Elyria, O.
Sac Tool Mfg. Co., St. Louis, Mo.
Snap-on Tools Corp., Kenosha, Wis.
Trimont Mfg. Co., Div. of Aetna Industrial Corp., Boston, Mass
V-Mac Industries, Guilford, Conn.
Weatherhead Co., Cleveland, O.

DAMPER OPERATORS

See Operators, Damper

DAMPER REGULATORS

See Regulators, Damper Sets

DAMPERS, DUCT, MANUALLY OPERATED

Acme Mfg. Co., Holmesburg, Philadelphia, Pa.
Adams Co., The, Dubuque, Ia.
● Air Conditioning Products Co., Detroit, Mich.
Air Control Products, Inc., Coopersville, Mich.
● Air & Refrigeration Corp., New York, N. Y.
Airecon Industries, Detroit, Mich.
American Foundry & Furnace Co., Bloomington, Ill.
American Warming & Ventilating Co., Toledo, O.
Corbman Bros., Inc., Philadelphia, Pa.
Elgo Shutter & Mfg. Co., Detroit, Mich.
Excelsior Steel Furnace Co., Chicago, Ill.
Goettl Bros. Metal Prod., Inc., Phoenix, Ariz.
Hart & Cooley Mfg. Co., Holland, Mich.
Inland Steel Products Co., Milwaukee, Wis.
Jacobs Co., B. & J., Cincinnati, O.
Kerentoff, G. L., Cincinnati, O.
Martens & Stormoen, Boston, Mass.
Meyer Mfg. Co., Detroit, Mich.
Ohio Products Co., Cleveland, O.
Salina Metal Products Co., Salina, Kan.
Sioux Steel Co., Sioux Falls, S. D.
Standard Furnace & Supply Co., Omaha, Neb.
● Titus Mfg. Corp., Waterloo, Ia.
Thermix Corp., The, Greenwich, Conn.
● Tuttle & Bailey, Inc., New Britain, Conn.
United States Register Co., Battle Creek, Mich.
Young Regulator Co., Cleveland, O.

DAMPERS, DUCT, REMOTE CONTROLLED

● Air Conditioning Products Co., Detroit, Mich.
● Air & Refrigeration Corp., New York, N. Y.
Airecon Industries, Detroit, Mich.
American Foundry & Furnace Co., Bloomington, Ill.
American Warming & Ventilating Co., Toledo, O.
● Anemostat Corp. of America, New York, N. Y.
● Autempco Corp., New York, N. Y.
Barber-Colman Co., Rockford, Ill.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Conoflow Corp., Philadelphia, Pa.
● Johnson Service Co., Milwaukee, Wis.
Meyer Mfg. Co., Detroit, Mich.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
● Powers Regulator Co., Chicago, Ill.
Shallcross Controls, Inc., Milwaukee, Wis.
Thermix Corp., The, Greenwich, Conn.
● Tuttle & Bailey, Inc., New Britain, Conn.
Vapor Heating Corp., Chicago, Ill.
Young Regulator Co., Cleveland, O.

DAMPERS, PULSATION, FOR PIPING SYSTEMS

Campbell Co., J. A., Long Beach, Calif.
● Taylor Instrument Companies, Rochester, N. Y.

DEAERATORS

Blackburn-Smith Mfg. Co., Hoboken, N. J.
Buflovac Equipment Div. of Blaw-Knox Co., Buffalo, N. Y.
Cochrane Corp., Philadelphia, Pa.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Croll-Reynolds Engrg. Co., Inc., New York, N. Y.
Elliott Co., Jeannette, Pa.
Fluor Corp., Ltd., The, Los Angeles, Calif.
Graham Mfg. Co., Inc., New York, N. Y.
Graver Water Conditioning Co., New York, N. Y.
Heat Transfer Products, Inc., Carbondale, Pa.
Hoppes Mfg. Co., Inc., Springfield, O.
Permutit Co., New York, N. Y.
Refinite Corp., Omaha, Neb.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
Sims Co., Erie, Pa.
Stickle Steam Specialties Co., Indianapolis, Ind.
● Whitlock Mfg. Co., Hartford, Conn.
Worthington Pump & Machinery Corp., Harrison, N. J.

DEEP WELL PUMPS

See Pumps, Deep Well

DEHUMIDIFIERS, ABSORPTION AND ADSORPTION

Bryant Heater Div., Affiliated Gas Equipment Co., Inc., Cleveland, O.
Carbide and Carbon Chemicals Corp., Unit of Union Carbide and Carbon Corp., New York, N. Y.
Cargocaire Engineering Corp., New York, N. Y. (for ships)
● Carrier Corp., Syracuse, N. Y.
Dow Chemical Co., The, Midland, Mich.
Dry Air Products Corp., Washington, D. C.
Drying Systems, Inc., Chicago, Ill.
Dryomatic Corp. of America, Baltimore, Md.
Floridin Co., Warren, Pa.
Kaufman Co., H. J., Detroit, Mich.
Morf Industries, Inc., Staten Island, N. Y.
● Niagara Industrial Corp., New York, N. Y.
Pittsburgh Lectrodryer Corp., Pittsburgh, Pa.
● Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Selas Corp. of America, Philadelphia, Pa.
Socony-Vacuum Oil Co., Inc., New York, N. Y.
Solvay Sales Div., Allied Chemical & Dye Corp., New York, N. Y.
Somers, Inc., H. J., Detroit, Mich.
● Surface Combustion Corp., Toledo, O.
Tamms Industries, Inc., Chicago, Ill.

DEHUMIDIFIERS, ELECTRIC PLUG-IN, FOR SMALL SPACES

Aqua-Sorb Co., East Orange, N. J.
Cargocaire Engineering Corp., New York, N. Y.
● Carrier Corp., Syracuse, N. Y.
Dryomatic Corp. of America, Baltimore, Md.
Ebco Mfg. Co., Columbus, O.
Frigidaire Div., General Motors Corp., Dayton, O.

DEHUMIDIFIERS, SPRAY

See Washers, Air

DEHUMIDIFYING UNITS

See Units, Air Conditioning; Dehumidifiers, Absorption and Adsorption

DEHYDRANT AND ACID NEUTRALIZER, FOR REFRIGERATING SYSTEMS

Highside Chemicals Co., Clifton, N. J.
Mueller Brass Co., Port Huron, Mich.
Selas Corp. of America, Philadelphia, Pa.
Weatherhead Co., Cleveland, O.

DEHYDRATORS, REFRIGERANT

Aluminum Co. of America, Pittsburgh, Pa.
Aminco Refrigeration Products Co., Detroit, Mich.
Automatic Products Co., Milwaukee, Wis.
Floridin Co., Warren, Pa.
Frigidaire Div., General Motors Corp., Dayton, O.
● Henry Valve Co., Melrose Park, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Joliet Chemicals, Inc., Joliet, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Madden Brass Products Co., The, Chicago, Ill.
McIntire Connector Co., Newark, N. J.
Mueller Brass Co., Port Huron, Mich.
Remco, Inc., Zelienople, Pa.
Selas Corp. of America, Philadelphia, Pa.
● Sporlan Valve Co., St. Louis, Mo.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Wabash Mfg. Co., Chicago, Ill.
Weatherhead Co., Cleveland, O.
Western Thermal Equipment Co., Los Angeles, Calif.

DESTROYERS, SOOT, CHEMICAL

Allen Co., Robert G., Mechanicsville, N. Y.
Ampion Corp., Long Island City, N. Y.
Coughlan Co., G. N., West Orange, N. J.
Desolvo Co., The, Pittsburgh, Pa.
Diamond Chemical Products, New York, N. Y.
Healy Ruff Co., St. Paul, Minn.
Hercules Chemical Co., Inc., New York, N. Y.
Kenite Laboratory, Inc., Madison, N. J.
MacDermid Chemical Co., Bristol, Conn.
National Aluminate Corp., Chicago, Ill.
Nutmeg Chemical Co., New Haven, Conn.

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O'Brien Industries, Jersey City, N. J.
Perolin Co., Inc., Chicago, Ill.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Saverite Engineering Co., Hoboken, N. J.
Tamms Industries, Inc., Chicago, Ill.
Vinco Co., Inc., The, New York, N. Y.
Western Chemical Co., Kansas City, Mo.

DESUPERHEATERS, STEAM

Babcock & Wilcox Co., New York, N. Y.
Brown Fintube Co., The, Elyria, O.
Cochrane Corp., Philadelphia, Pa.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
● Foster Wheeler Corp., New York, N. Y.
Northern Equipment Co., Erie, Pa.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
● Whitlock Mfg. Co., Hartford, Conn.

DETECTORS, LEAK, REFRIGERANT

Condenser Service & Engineering Co., Inc., Hoboken, N. J.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Goss Gas, Inc., Pittsburgh, Pa.
Highside Chemicals Co., Clifton, N. J.
Justrite Mfg. Co., Chicago, Ill.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Turco Products, Inc., Los Angeles, Calif.
Turner Brass Wks, Sycamore, Ill.
Vacuum-Electronic Engineering Co., Brooklyn, N. Y.
Western Thermal Equipment Co., Los Angeles, Calif.

DETECTORS, LEAK, UNDERGROUND PIPING

Fisher Research Laboratory, Inc., Palo Alto, Calif.
Wilkinson Products Co., Los Angeles, Calif.

DEVICES, ELECTROLYTIC, FOR PREVENTING CORROSION

Apex Engineering Co., Chicago, Ill.
Aqua Electric Scale Control, Inc., Cleveland, O.
Brown Electric Co., Oklahoma City, Okla.
Electro Rust-Proofing Corp., Belleville, N. J.
McRay Products Co., South Pasadena, Calif.
Rotometals, Inc., San Francisco, Calif.
Wallace & Tiernan Co., Inc., Newark, N. J.

DEW POINT INDICATORS

See Indicators, Dew Point

DIAPHRAGM VALVES

See Valves, Diaphragm

DIESEL ENGINES

See Engines, Diesel, for Fan, Pump and Compressor Drives

DIFFUSERS, AIR, HIGH VELOCITY

See also Grilles; Panels, Perforated, for Air Diffusion; Registers

● A-J Mfg. Co., Kansas City, Mo.
Air Control Products, Inc., Coopersville, Mich.
● Air Devices, Inc., New York, N. Y.
Aladdin Heating Corp., Oakland, Calif.
● Anemostat Corp. of America, New York, N. Y.
Barber-Colman Co., Rockford, Ill.
● Connor Engineering Corp., W. B., New York, N. Y.
Demuth & Sons, Charles, Mineola, L. I., N. Y.
Hart & Cooley Mfg. Co., Holland, Mich.
● Titus Mfg. Corp., Waterloo, Ia.
● Tuttle & Bailey, Inc., New Britain, Conn.

DIFFUSION, AIR

See Panels, Perforated, for Air Diffusion

DISTRIBUTORS, WATER, FOR CONDENSERS

● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
● Martocello & Co., Jos. A., Philadelphia, Pa.
● York Corp., York, Pa.

DOOR CONTROLS

See Controls, Door, Electric Eye

DOORS AND PANELS, ACCESS

Adams Co., The, Dubuque, Ia.
American Foundry & Furnace Co., Bloomington, Ill.
American Sheet Metal Works, New Orleans, La.
● Auer Register Co., Cleveland, O.
Biersach & Niedermeyer Co., Milwaukee, Wis.
Camloc Fastener Corp., New York, N. Y. (Fasteners for)
● Clarage Fan Co., Kalamazoo, Mich.
Decatur Iron & Steel Co., Decatur, Ala.
Falstrom Co., Passaic, N. J.
Inland Steel Products Co., Milwaukee, Wis.
International Steel Co., Evansville, Ind.
Kane Mfg. Corp., Kane, Pa.
Kirk & Blum Mfg. Co., Cincinnati, O.
Lockjoint Wood Products Co., Wichita, Kan.
Lumm Co., A. H., Toledo, O.
Technical Ply-Woods, Chicago, Ill.
Truscon Steel Co., Youngstown, O.
Walsh Co., L. M., The, Boston, Mass.
Western Wire & Iron Works, Inc., Chicago, Ill. (Metal)

DRAFT CONTROL

See Controls, Draft, Barometric; Regulators, Draft, Combustion

DRAFT GAGES

See Gages, Indicating, Draft

DRAFT RECORDERS

See Recorders, Draft

DRAFT REGULATORS

See Controls, Draft, Barometric; Regulators, Draft, Combustion

DRAWING TEMPLATES, PIPING

See Templates, Drawing, Piping

DRIERS

See Dehydrators, Refrigerant

DRILLS, ELECTRIC AND PNEUMATIC, PORTABLE

Albertson & Co., Inc., Sioux City, Ia.
Black & Decker Mfg. Co., Towson, Md.
Buckeye Tools Corp., Dayton, O.
Chicago Pneumatic Tool Co., New York, N. Y.
Cincinnati Electrical Tool Co., The, Cincinnati, O.
Clark Electric Co., Jas., Jr., Louisville, Ky.
Duro Metal Products Co., Chicago, Ill.
Independent Pneumatic Tool Co., Aurora, Ill.
Ingersoll-Rand Co., New York, N. Y.
● Joy Mfg. Co., Pittsburgh, Pa.
Keller Tool Co., Grand Haven, Mich.
Lee Co., K. O., Aberdeen, S. D.
Mall Tool Co., Chicago, Ill.
Millers Falls Co., Greenfield, Mass.
Paramount Products Co., New York, N. Y.
Portable Electric Tools, Inc., Chicago, Ill.
R C S Tool Sales Corp., Joliet, Ill.
Signal Electric Mfg. Co., Menominee, Mich.
Skilsaw, Inc., Chicago, Ill.
Spartan Tool Co., Chicago, Ill.
Speedway Mfg. Co., Chicago (Cicero), Ill.
Stanley Electric Tools, Div. of The Stanley Works, New Britain, Conn.
Syntron Co., Homer City, Pa.
U. S. Electrical Tool Co., Cincinnati, O.
Van Dorn Electric Tool Co., Towson, Md.
Wiley's Carbide Tool Co., Detroit, Mich.
Wodack Electric Tool Corp., Chicago, Ill.

DRILLS, POWDER OPERATED

Mine Safety Appliances Co., Pittsburgh, Pa. (drives studs for pipe hangers, etc. into concrete)
● Stemco Corp., The, Rocky River, O.
Tempo Products Co., Cleveland, O.

DRIVES, CHAIN

Caldwell Co., W. E., Louisville, Ky.
Chain Belt Co., Milwaukee, Wis.
CraneVeyor Corp., Los Angeles, Calif.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Horton Mfg. Co., Minneapolis, Minn.
Jeffrey Mfg. Co., Columbus, O.
Link-Belt Co., Indianapolis, Ind.
Medart Co., St. Louis, Mo.
Morse Chain Co., Detroit, Mich.
Ramsey Chain Co., Inc., Albany, N. Y.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Whitney Chain & Mfg. Co., The, Hartford, Conn.

DRIVES, FLAT BELT

See also Belting, Leather and Belting, Rubber

American Pulley Co., Philadelphia, Pa.
Baldwin Belting, Inc., New York, N. Y.
Browning Mfg. Co., Inc., Maysville, Ky.
Caldwell Co., W. E., Louisville, Ky.
Chicago Belting Co., Chicago, Ill.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Dick Co., Inc., R. & J., Passaic, N. J.
● Dodge Mfg. Corp., Mishawaka, Ind.
Gates Rubber Co., The, Denver, Colo.
Goodrich Co., B. F., Akron, O.

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Horton Mfg. Co., Minneapolis, Minn.
Medart Co., St. Louis, Mo.
Pyott Foundry & Machine Co., Chicago, Ill.
Rhoads & Sons, J. E., Philadelphia, Pa.
Rockwood Mfg. Co., Inc., Indianapolis, Ind.
Williams & Son, I. B., Dover, N. H.
Wood's Sons Co., T. B., Chambersburg, Pa.

DRIVES, V BELT

● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia, Pa.
Baldwin Belting, Inc., New York, N. Y.
Browning Mfg. Co., Inc., Maysville, Ky.
Chicago Belting Co., Chicago, Ill.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Congress Drives Div., Tann Corp., Detroit, Mich.
Continental Rubber Wks, Erie, Pa.
● Dayton Rubber Co., Dayton, O.
Dick Co., Inc., R. & J., Passaic, N. J.
● Dodge Mfg. Corp., Mishawaka, Ind.
Gates Rubber Co., The, Denver, Colo.
Goldens' Foundry & Machine Co., Columbus, Ga.
Goodrich Co., B. F., Akron, O.
Horton Mfg. Co., Minneapolis, Minn.
Jones Foundry & Machine Co., W. A., Chicago, Ill.
Maurey Mfg. Corp., Chicago, Ill.
Medart Co., St. Louis, Mo.
Pyott Foundry & Machine Co., Chicago, Ill.
Rockwood Mfg. Co., Inc., Indianapolis, Ind.
Salsbury Motors, Inc., Pomona, Calif.
Thermoid Co., Trenton, N. J.
V-Belt Clutch Co., Los Angeles, Calif.
Wood's Sons Co., T. B., Chambersburg, Pa.
Worthington Pump & Machinery Corp., Harrison, N. J.

DRIVES, VARIABLE SPEED

See Changers, Speed, Hydraulic Coupling; Changers, Speed, Mechanical; Reducers, Speed; Pulleys and Sheaves, for Belt Drives

DRYERS, INDUSTRIAL (COMPARTMENT, TUNNEL CONVEYOR, VACUUM, SPRAY, ROTARY, ETC.)

Bowen Engineering, Inc., North Branch, N. J.
Buflovac Equipment Div. of Blaw-Knox Co., Buffalo, N. Y.
● Campbell Heating Co., Des Moines, Ia.
● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., Pittsburgh, Pa.
Drying Systems, Inc., Chicago, Ill.
Economy Equipment Co., Chicago, Ill.
● Enterprise Engine & Foundry Co., San Francisco, Calif.
Hersey Mfg. Co., South Boston, Mass.
Instant Drying Corp., New York, N. Y.
Jackson & Church Co., Saginaw, Mich. (Dryer for corn, grain, hops, and wood)
Kirk & Blum Mfg. Co., Cincinnati, O.
Link-Belt Co., Chicago, Ill.
Louisville Drying Machine Div., General American Transportation Corp., Louisville, Ky.
Newcomb-Detroit Co., Detroit, Mich.
Peters-Dalton, Inc., Detroit, Mich.
Proctor & Schwartz, Inc., Philadelphia, Pa.
Raymond Pulverizer Div., Combustion Engineering Co., Chicago, Ill.
Ross Engineering Corp., J. O., New York, N. Y.
Shallcross Controls, Inc., Milwaukee, Wis.
Stokes Machine Co., F. J., Philadelphia, Pa.
Struthers Wells Corp., Titusville, Pa.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Western Precipitation Corp., Los Angeles, Calif.

DRYERS, REFRIGERANT

See Dehydrators, Refrigerant

DUAL THERMOSTATS

See Thermostats, Two Temperature or Dual

DUCT CONNECTIONS

See Connections, Duct, Flexible; Connectors for Non-Metallic Duct Fabrication

DUCT FURNACES

See Heaters, Duct

DUCT HEATERS

See Heaters, Duct

DUCT INSULATION

See Insulation, Duct

DUCT THERMOSTATS

See Thermostats, Duct Type

DUCT TURNING VANES

See Vanes, Duct Turning, Prefabricated

DUCTS AND DUCT FITTINGS, PREFABRICATED, METALLIC

Acer & Whedon, Inc., Medina, N. Y.
Acme Mfg. Co., Holmesburg, Philadelphia, Pa.
Adelta Mfg. Co., Inc., Philadelphia, Pa.
Ajax Furnace Fitting Co., Div. of Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Champion Furnace Pipe Co., Peoria, Ill.
Char-Gale Mfg. Co., Minneapolis, Minn.
Chicago Furnace Supply Co., Chicago, Ill.
Chicago Metal Hose Corp., Maywood, Ill.
Clayton & Lambert Mfg. Co., Louisville, Ky.
Corbman Bros., Inc., Philadelphia, Pa.
Excelsior Steel Furnace Co., Chicago, Ill.
General Corporation, Minneapolis, Minn.
Goettl Bros. Metal Prod., Inc., Phoenix, Ariz.
Gray Metal Products, Inc., Rochester, N. Y.
Henry Furnace Co., The, Medina, O.
Howes-Woods Co., Cambridge, Mass.
Inland Steel Products Co., Milwaukee, Wis.
International Heater Co., Utica, N. Y.
Jacobs Co., B. & J., Cincinnati, O.
Lennox Furnace Co., Marshalltown, Ia., Syracuse, N. Y., & Columbus, O.
Littleford Bros., Inc., Cincinnati, O.
Meyer & Bro. Co., F., Peoria, Ill.
Moncrief Furnace Co., Atlanta, Ga.
● Mueller Furnace Co., L. J., Milwaukee, Wis.
Ohio Valley Hardware & Roofing Co., Evansville, Ind.
Schecter Brothers Co., Philadelphia, Pa.
Sioux Steel Co., Sioux Falls, S. D.
Smith-Raymond Co., Columbus, Ga.
Standard Furnace & Supply Co., Omaha, Neb.
United States Register Co., Battle Creek, Mich.
Van Noorden Co., E. Boston, Mass.
Viking Mfg. Corp., Cleveland, O.
Waverly Heating Supply Co., Boston, Mass.
Williamson Heater Co., Cincinnati, O.

DUCTS AND DUCT FITTINGS, PREFABRICATED, NON-METALLIC

American Ventilating Hose Co., New York, N. Y.
Arrowhead Rubber Co., Los Angeles, Calif.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
du Pont de Nemours & Co., E. I., Fabrics & Finishes Dept., Wilmington, Del.
Flexible Tubing Corp., Branford, Conn.
Haveg Corp., Newark, Del. (for fumes)
Jacobs Co., B. & J., Cincinnati, O.
Johns-Manville, New York, N. Y.
Knight, Maurice A., Akron, O.
Smith-Raymond Co., Columbus, Ga.
United States Rubber Co., New York, N. Y.

DUST COLLECTORS

See Collectors, Dust

DUST COUNTERS

See Counters, Dust

ECONOMIZERS, FUEL

Babcock & Wilcox Co., New York, N. Y.
Combustion Engineering-Superheater, Inc., New York, N. Y.
● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Edge Moor Iron Works, Inc., Edge Moor, Del.
● Foster Wheeler Corp., New York, N. Y.
Green Fuel Economizer Co., Beacon, N. Y.
Richmond Engineering Co., Inc., Richmond, Va.
Springfield Boiler Co., Springfield, Ill.

EJECTORS, SEWAGE

American-Marsh Pumps, Inc., Battle Creek, Mich.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
● Chicago Pump Co., Chicago, Ill.
● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davidson Co., M. T., Brooklyn, N. Y.
● Economy Pumps, Inc., Hamilton, O.
● Nash Engineering Co., South Norwalk, Conn.
Penberthy Injector Co., Detroit, Mich.
Quimby Pump Div., H. K. Porter Co., Inc., Pittsburgh, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Swaby Mfg. Co., Chicago, Ill.
Taber Pump Co., Buffalo, N. Y.
● Weil Pump Co., Chicago, Ill.
● Whittington Pump & Engineering Corp., Indianapolis, Ind.
Yeomans Bros. Co., Chicago, Ill.

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ELBOWS, BALANCING, FOR HOT WATER HEATING SYSTEMS

Hammond Brass Works, Hammond, Ind.
Kehm Corp., The, Chicago, Ill.
● Sarcotherm Controls, Inc., New York, N. Y.

ELECTRIC AIR CLEANERS

See Cleaners, Air, Electrical

ELECTRICAL RADIANT HEATING

See Conductors and Panels, Electrical, for Radiant Heating

ELECTRIC DRILLS

See Drills, Electric, Portable

ELECTRIC MOTORS

See Motors, Electric

ELECTRIC PIPE HEATING SYSTEMS

See Systems, Electric Pipe Heating

ELECTRIC SHEARS

See Shears, Electric, Portable

ELECTRIC UNIT HEATERS

See Heaters, Unit, Electric Heating Element

ELECTRIC WATER HEATERS

See Heaters, Water, Electric

ELECTRODES, ARC WELDING

Air Reduction Sales Co., New York, N. Y.
All-State Welding Alloys Co., Inc., White Plains, N. Y.
Allegheny Ludlum Steel Corp., Pittsburgh, Pa. (Stainless)
Allied Weld-Craft, Inc., Indianapolis, Ind.
Aluminum Co. of America, Pittsburgh, Pa.
American Agile Corp., Cleveland, O.
American Brass Co., Waterbury, Conn.
American Steel & Wire Co., United States Steel Corp. Subsidiary, Cleveland, O.
Arcos Corp., Philadelphia, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Electric Arc., Inc., Newark, N. J.
Eutectic Welding Alloys Corp., New York, N. Y.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Harnischfeger Corp., Milwaukee, Wis.
Hobart Bros. Co., Troy, O.
International Nickel Co., Inc., The, New York, N. Y.
Jessop Steel Co., Washington, Pa.
Laclede Steel Co., St. Louis, Mo.
● Lincoln Electric Co., Cleveland, O.
Marquette Mfg. Co., Minneapolis, Minn.
Maurath, Inc., Cleveland, O.
McKay Co., Pittsburgh, Pa.
Metal & Thermit Corp., New York, N. Y.
Mir-O-Col Alloy Co., Inc., Los Angeles, Calif.
National Carbon Co., New York, N. Y.
National Cylinder Gas Co., Chicago, Ill.
Page Steel & Wire Division of American Chain & Cable Co., Inc., Monessen, Pa.
Sight Feed Generator Co., West Alexandria, O.
Smith Corp., A. O., Milwaukee, Wis.
Trindl Products, Ltd., Chicago, Ill.
Welding Apparatus Co., Chicago, Ill.
● Westinghouse Electric Corp., Pittsburgh, Pa.
Wilson Welder & Metals Co., Inc., New York, N. Y.

ELIMINATORS, AIR, FOR HEATING AND PIPING SYSTEMS

● Anderson Co., V. D., The, Cleveland, O.
● Armstrong Machine Works, Three Rivers, Mich.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
● Bell & Gossett Co., Morton Grove, Ill.
● Dole Valve Co., The, Chicago, Ill.
Gorton Heating Corp., Cranford, N. J.
● Grinnell Co., Inc., Providence, R. I.
● Hoffman Specialty Co., Indianapolis, Ind.
● Illinois Engineering Co., Chicago, Ill.
Livingstone Engineering Co., Worcester, Mass.
● Maid-O'-Mist, Inc., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Moreheat Distribution, Inc., Cincinnati, O.
Mouat Vapor Heating Co., The, Cleveland, O.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
Schaible Co., The, Cincinnati, O.
● Sterling, Inc., Milwaukee, Wis.
Taco Heaters, Inc., Providence, R. I.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Vapor Specialty Co., New York, N. Y.
Wright-Austin Co., Detroit, Mich.

ENAMELS AND LACQUERS

Acme White Lead & Color Works, Detroit, Mich.
Acorn Refining Co., Cleveland, O.
American-Marietta Co., Chicago, Ill.
Arco Co., Cleveland, O.
Atlas Powder Co., North Chicago, Ill.
Baer Bros., New York, N. Y.
Blue Ridge Talc Co., Inc., Henry, Va.
Claronex Products, Inc., Brooklyn, N. Y.
Cordo Chemical Co., Norwalk, Conn.
Debevoise Co., The, Brooklyn, N. Y.
Devoe & Raynolds Co., Inc., New York, N. Y.
du Pont de Nemours & Co. (Inc.), E. I., Fabrics & Finishes Dept., Wilmington, Del.
Hague & Co., Alfred, Brooklyn, N. Y.
Heresite & Chemical Co., Manitowoc, Wis.
Hilo Varnish Corp., Brooklyn, N. Y.
Horn Co., Inc., A. C., Long Island City, N. Y.
Inter-Coastal Paint Corp., East St. Louis, Ill.
Interchemical Corp., Finishes Div., Newark, N. J.
Irvington Varnish and Insulator Co., Irvington, N. J.
Knight, Maurice A., Akron, O.
Koppers Co., Inc., Pittsburgh, Pa.
Krehbiel Co., J. H., Chicago, Ill.
Maas & Waldstein Co., Newark, N. J.
Master Mechanics Co., Cleveland, O.
Midwest Products Co., Port Byron, Ill.
O'Brien Corp., The, South Bend, Ind.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Quigley Co., Inc., New York, N. Y.
Reilly Tar & Chemical Corp., Indianapolis, Ind.
Sherwin-Williams Co., The, Cleveland, O.
Sipe & Co., James B., Pittsburgh, Pa.
Sonneborn Sons, Inc., L., New York, N. Y.
Southport Paint Co., Div. Wesson Oil & Snowdrift Co., Inc., Savannah, Ga.
Thompson & Co., Oakmont, Pa.
Tropical Paint & Oil Co., Cleveland, O.
Truscon Laboratories, Detroit, Mich.
U. S. Gutta Percha Paint Co., Providence, R. I.
United Chromium, Inc., New York, N. Y.
Wilbur & Williams Co., Boston, Mass.
Wilhelm Co., A., Reading, Pa.
Zaco Laboratories, Div. Zip Abrasive Co., Cleveland, O. (spray units)

ENGINES, DIESEL, FOR FAN, PUMP AND COMPRESSOR DRIVES

American Locomotive Co., Auburn, N. Y.
Anderson Diesel Engine Co., Philadelphia, Pa.
Baldwin Locomotive Wks., Philadelphia, Pa.
Buda Co., Harvey, Ill.
Caterpillar Tractor Co., Peoria, Ill.
Chicago Pneumatic Tool Co., New York, N. Y.
Continental Motors Corp., Muskegon, Mich.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Detroit Diesel Engine Div., General Motors Corp., Detroit, Mich.
Fairbanks, Morse & Co., Chicago, Ill.
Hill Diesel Engine Div. of Indian Motocycle Co., Lansing, Mich.
Ingersoll-Rand Co., New York, N. Y.
Waukesha Motor Co., Waukesha, Wis.
Witte Engine Works, Div. of Oil Well Supply Co., United States Steel Corp., Sub., Kansas City, Mo.
Worthington Pump & Machinery Corp., Harrison, N. J.

ENGINES, GAS, FOR FAN, PUMP AND COMPRESSOR DRIVES

Buda Co., Harvey, Ill.
Chicago Pneumatic Tool Co., New York, N. Y.
Continental Motors Corp., Detroit, Mich.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Fairbanks, Morse & Co., Chicago, Ill.
Ingersoll-Rand Co., New York, N. Y.
Salsbury Motors, Inc., Pomona, Calif.
Waukesha Motor Co., Waukesha, Wis.
Witte Engine Works, Div. of Oil Well Supply Co., United States Steel Corp., Sub., Kansas City, Mo.
Worthington Pump & Machinery Corp., Harrison, N. J.

ENGINES, STEAM, FOR FAN, PUMP AND COMPRESSOR DRIVES

● Ames Iron Wks., Div. of Pierce, Butler Radiator Corp., Oswego, N. Y.
Harrisburg Machinery Corp., Harrisburg, Pa.
Skinner Engine Co., Erie, Pa.
Troy Engine & Machine Co., Troy, Pa.
Vilter Mfg. Co., Milwaukee, Wis.

EQUIPMENT, BALANCING

Bear Mfg. Co., Industrial Div., Rock Island, Ill.
Gisholt Machine Co., Madison, Wis.
Olsen Testing Machine Co., Tinius, Willow Grove, Pa.

EVAPORATIVE CONDENSERS

See Condensers, Refrigerating, Evaporative

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EVAPORATORS

See Chillers, Water

EXCHANGERS, HEAT

- ● Aerofin Corp., Syracuse, N. Y.
- Airecon Industries, Detroit, Mich.
- Aluminum Co. of America, Pittsburgh, Pa.
- ● American District Steam Co., North Tonawanda, N. Y.
- American Locomotive Co., Alco Products Div., New York, N. Y.
- Armstrong Co., Richard M., Westchester, Pa.
- Baker Refrigeration Corp., Inc., South Windham, Me.
- ● Bell & Gossett Co., Morton Grove, Ill.
- Biggs Boiler Wks., Co., The, E. Akron, O.
- Blackburn-Smith Mfg. Co., Hoboken, N. J.
- Black-Sivalls & Bryson, Inc., Kansas City, Mo.
- Brown Fintube Co., The, Elyria, O.
- ● Brownell Co., The, Dayton, O.
- Clifford Mfg. Co., Div. of Standard-Thomson Corp., Waltham, Mass.
- ● Condenser Service & Engineering Co., Inc., Hoboken, N. Y.
- Croll-Reynolds Engineering Co., Inc., New York, N. Y.
- Dahlquist Mfg. Co., Inc., Div. of Process Engineering Inc., Somerville, Mass.
- ● Davis Engineering Corp., Elizabeth, N. J.
- Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., Pittsburgh, Pa.
- Downingtown Iron Works, Downingtown, Pa.
- ● Doyle & Roth Mfg. Co., Brooklyn, N. Y.
- Drying Systems, Inc., Chicago, Ill.
- ● Duriron Co., The, Dayton, O. (acid resisting)
- Dutton Co., C. H., Kalamazoo, Mich.
- Eastern Industries, Inc., New Haven, Conn.
- Farrar & Trefts, Buffalo, N. Y.
- ● Foster Wheeler Corp., New York, N. Y.
- General Ceramics & Steatite Corp., Keasbey, N. J. (Imperrious Graphite)
- General Fittings Co., Providence, R. I.
- Gilbert Brass Foundry Co., St. Louis, Mo.
- Goodyer Industries, Inc., Chicago, Ill.
- Graham Mfg. Co., Inc., New York, N. Y.
- Graver Water Conditioning Co., New York, N. Y.
- Griscom-Russell Co., The, New York, N. Y.
- Heat Transfer Products, Inc., Carbondale, Pa.
- Howard Iron Works & Alberger Heater Div., Buffalo, N. Y.
- ● Joy Mfg. Co., Pittsburgh, Pa.
- Kaiser Co., E. B., Chicago, Ill.
- Keckley Co., O. C., Chicago, Ill.
- Kellogg Co., M. W., The, New York, N. Y.
- Kold-Hold Mfg. Co., Lansing, Mich.
- Kopperman & Sons, Joseph, Philadelphia, Pa.
- Koven & Bro., Inc., L. O., Jersey City, N. J.
- Larkin Coils, Atlanta, Ga.
- MagniLastic Div., Cook Electric Co., Chicago, Ill.
- Manitowoc Engineering Wks., Manitowoc, Wis.
- ● Marlo Coil Co., St. Louis, Mo.
- McQuay, Inc., Minneapolis, Minn.
- Minimite Co., Chicago, Ill.
- ● Modine Mfg. Co., Racine, Wis.
- Mueller Brass Co., Port Huron, Mich.
- ● Murray Mfg. Co., D. J., Wausau, Wis.
- National Carbon Co., New York, N. Y.
- National Pipe Bending Co., New Haven, Conn.
- ● Niagara Blower Co., New York, N. Y.
- Nooter Corp., St. Louis, Mo.
- Parker Appliance Co., The, Cleveland, O.
- Patterson-Kelley Co., Inc., East Stroudsburg, Pa.
- Peerless of America, Inc., Chicago, Ill.
- Perfex Corp., Milwaukee, Wis.
- ● Prat-Daniel Corp., East Port Chester, Conn.
- ● Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
- Quaker City Iron Works, Philadelphia, Pa.
- Refrigeration Appliances, Inc., Chicago, Ill.
- Refrigeration Economics Co., Inc., Canton, O.
- Roessing Mfg. Co., Pittsburgh, Pa.
- Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
- Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
- Schutte & Koerting Co., Philadelphia, Pa.
- Sims Co., Erie, Pa.
- Smith Corp., A. O., Milwaukee, Wis.
- Stout & Sons, David, St. Louis, Mo.
- Superior Valve & Fittings Co., Pittsburgh, Pa.
- Taco Heaters, Inc., Providence, R. I.
- Thermal Industries, Indio, Calif.
- ● Thrush & Co., H. A., Peru, Ind.
- ● Trane Co., The, LaCrosse, Wis.
- ● United States Air Conditioning Corp., Mmneapolis, Minn.
- Valley Foundry & Machine Works, Inc., Fresno, Calif.
- Vapor Heating Corp., Chicago, Ill.
- Vilter Mfg. Co., Milwaukee, Wis.
- Vogt Machine Co., Henry, Louisville, Ky.
- ● Westinghouse Electric Corp., Pittsburgh, Pa.
- ● Whitlock Mfg. Co., Hartford, Conn.
- Wilson Engineering Corp., Chicago, Ill.
- Worthington Pump & Machinery Corp., Harrison, N. J.
- ● York Corp., York, Pa.
- ● Young Radiator Co., Racine, Wis.
- Yula Water Heaters, Inc., New York, N. Y.

EXCHANGERS, HEAT, REFRIGERANT SUCTION LINE

- ● Acme Industries, Inc., Jackson, Mich.
- Armstrong Co., Richard M., Westchester, Pa.
- Betz Corp, Hammond, Ind.
- Blackburn-Smith Mfg. Co., Hoboken, N. J.
- Brown Fintube Co., The, Elyria, O.
- ● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
- ● Davis Engineering Corp., Elizabeth, N. J.
- ● Doyle & Roth Mfg. Co., Brooklyn, N. Y.
- Gerstein & Cooper Co., Inc., South Boston, Mass.
- Heat-X-Changer Co., Inc., The, Brewster, N. Y.
- Kramer Trenton Co., Trenton, N. J.
- ● Marlo Coil Co., St. Louis, Mo.
- Mueller Brass Co., Port Huron, Mich.
- Peerless of America, Inc., Chicago, Ill.
- Refrigeration Economics Co., Inc., Canton, O.
- Temprite Products Corp., Detroit, Mich.
- Wabash Mfg. Co., Chicago, Ill.
- ● Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.

EXHAUST HEADS

See Heads, Exhaust, for Pipe Lines

EXHAUSTERS, WELDING FUME

- Aladdin Heating Corp., Oakland, Calif.
- ● American Blower Corp., Detroit, Mich.
- American Machine Products Co., Marshalltown, Ia.
- Champion Blower & Forge Co., Lancaster, Pa.
- Chelsea Fan & Blower Co., Inc., Irvington, N. J.
- Chicago Blower Corp., Chicago, Ill.
- Coppus Engineering Corp., Worcester, Mass.
- Dana Fan & Blower Corp., Cincinnati, O.
- Day Co., The, Minneapolis, Minn.
- Emerson Electric Mfg. Co., The, St. Louis, Mo.
- ● General Blower Co., Morton Grove, Ill.
- Jenn Air Products Co., Indianapolis, Ind.
- Kirk & Blum Mfg. Co., Cincinnati, O.
- Mine Safety Appliances Co., Pittsburgh, Pa.
- Peters-Dalton, Inc., Detroit, Mich.
- ● Propellair Div., Robbins & Myers Inc., Springfield, O.
- Ruemelin Mfg. Co., Milwaukee, Wis.
- Torit Mfg. Co., St. Paul, Minn.
- Utility Appliance Corp., Los Angeles, Calif.
- Whiting Corp., Harvey, Ill.
- ● Wing Mfg. Co., L. J., New York, N. Y.
- Wind-Way Fan & Ventilator Co., New Orleans, La.

EXPANDERS, BOILER TUBE

- Wilson, Inc., Thomas C., Long Island City, N. Y.

EXPANSION BENDS

See Bends, Expansion

EXPANSION BOLTS

See Bolts, Expansion

EXPANSION JOINTS

See Joints, Pipe, Expansion

EXPANSION TANKS

See Tanks, Expansion, for Hot Water Heating Systems

EXPANSION VALVES

See Valves, Refrigeration

EXTRACTORS, PIPE

- Reps Tool Co., Inc., Hartford Conn.
- ● Ridge Tool Co., Elyria, O.

FABRICATED PIPING

See Bends; Headers; Joints, etc.

FABRICATORS, PIPE

See Headers, Welded; and Coils, Pipe

FAN BALANCING EQUIPMENT

See Equipment, Balancing

FAN BASES

See Bases and Pads, Vibration Isolating

FAN BLADES

See Blades, Propeller Fan

FAN HOUSINGS

See Housings, Fan, Centrifugal

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FANS, AXIAL FLOW, PRESSURE TYPE

Aerovent Fan Co., Inc., Piqua, O. (Tubeaxial)
● American Blower Corp., Detroit, Mich.
● Buffalo Forge Co., Buffalo, N. Y.
Chicago Blower Corp., Chicago, Ill. (tube axial)
Circulators & Devices Mfg. Corp., New York, N. Y. (vaneaxial)
● De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Dynamic Air Engineering, Inc., Los Angeles, Calif.
Hartzell Propeller Fan Co., Piqua, O.
Ilg Electric Ventilating Co., Chicago, Ill.
International Engineering Inc., Dayton, O.
● Joy Mfg. Co., Pittsburgh, Pa.
● Moore Co., The, Marceline, Mo. (vaneaxial)
Muckle Mfg. Co., Owatonna, Minn.
● Propellair Div., Robbins & Myers Inc., Springfield, O.
Sensenich Corp., Lancaster, Pa.
● South Bend Air Products, Inc., South Bend, Ind.
● Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
● Wing Mfg. Co., L. J., New York, N. Y.

FANS, CENTRIFUGAL

Advance Aluminum Castings Corp., Chicago, Ill.
Advance Fan & Blower Co., Detroit, Mich.
Air Controls, Inc., Div. of Cleveland Heater Co., Cleveland, O.
Aladdin Heating Corp., Oakland, Calif.
Allington & Curtis Mfg. Co., Saginaw, Mich.
● American Blower Corp., Detroit, Mich.
American Foundry & Furnace Co., Bloomington, Ill.
American Machine Products Co., Marshalltown, Ia.
Bayley Blower Co., Milwaukee, Wis.
Bern's Mfg. Co., Chicago, Ill.
● Bishop & Babcock Mfg. Co., Cleveland, O.
Blower Application Co., Milwaukee, Wis.
● Brundage Co., The, Kalamazoo, Mich.
● Buffalo Forge Co., Buffalo, N. Y.
● Campbell Heating Co., Des Moines, Ia.
Campbell Heating Co., E. K., Kansas City, Mo.
Century Fan & Ventilator Co., Stamford, Conn.
Champion Blower & Forge Co., Lancaster, Pa.
Chicago Blower Corp., Chicago, Ill.
Chicago Fan & Fin Coil Co., Chicago, Ill.
● Clarage Fan Co., Kalamazoo, Mich.
Coppus Engineering Corp., Worcester, Mass.
Day Co., The, Minneapolis, Minn.
● Duriron Co., Inc., Dayton, O. (Acid resisting)
Eastern Air Devices, Inc., Brooklyn, N. Y.
Eclipse Fuel Engineering Co., Rockford, Ill.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Garden City Fan Co., Chicago, Ill.
General Blower Co., Inc., Philadelphia, Pa.
● General Blower Co., Morton Grove, Ill.
Goettl Bros. Metal Products Inc., Phoenix, Ariz.
Green Fuel Economizer Co., Beacon, N. Y.
Hastings Air Conditioning Co., Hastings, Neb.
Ilg Electric Ventilating Co., Chicago, Ill.
Indiana Fan Company, Indianapolis, Ind.
International Sales Co., San Francisco, Calif.
Jackson & Church Co., Saginaw, Mich.
Jaden Mfg. Co., Hastings, Neb.
Jamieson Mfg. Co., Dallas, Tex.
Jeffrey Mfg. Co., Columbus, O.
Jenn Air Products Co., Indianapolis, Ind.
● King Co., The, Owatonna, Minn.
Lau Blower Co., Dayton, O.
Lehigh Fan & Blower Co., Allentown, Pa.
Lienweber Propellers, Chicago, Ill.
MaGirl Foundry & Furnace Co., Bloomington, Ill.
Mahr Mfg. Co., Div. of Diamond Iron Wks., Inc., Minneapolis, Minn.
Martin Fan & Blower Co., Chicago, Ill.
Montag Stove & Furnace Wks., Portland, Ore.
Morrison Products, Inc., Cleveland, O.
Motionair Co., Los Angeles, Calif.
Mountain States Equipment Co., Denver, Colo.
● Mueller Furnace Co., L. J., Milwaukee, Wis.
National Engineering & Mfg. Co., Kansas City, Mo.
● Nelson Corp., Herman, Moline, Ill.
● New York Blower Co., Chicago, Ill.
Newcomb-Detroit Co., Detroit, Mich.
● Niagara Blower Co., New York, N. Y.
Northern Blower Co., Cleveland, O.
Palmer Mfg. Co., Phoenix, Ariz.
Peerless Electric Co., Warren, O.
Phelps Mfg. Co., Little Rock, Ark.
● Prat-Daniel Corp., East Port Chester, Conn.
Reynolds Mfg. Co., The, Grand Rapids, Mich.
Redmond Co., Inc., Owosso, Mich.
Ripley Co., Inc., L-R Blower Div., Middletown, Conn.
St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Schwitzer-Cummins Co., Indianapolis, Ind.
Sprout-Waldron & Co., Muncy, Pa.
Trade-Wind Motorfans, Inc., Los Angeles, Calif.
● Trane Co., The, LaCrosse, Wis.
● Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
● United States Air Conditioning Corp., Minneapolis, Minn.
Utility Appliance Corp., Los Angeles, Calif.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Viking Air Conditioning Corp., Cleveland, O.
Western Blower Co., Seattle, Wash.
● Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.

FANS, PROPELLER

Acme Equipment Co., Muskogee, Okla.
Aerovent Fan Co., Inc., Piqua, O.
Air Controls, Inc., Div. of Cleveland Heater Co., Cleveland, O.
Air Equipment Co., Chicago, Ill.
Airecon Industries, Detroit, Mich.
Aire-Foile Fan & Blower Co., Detroit, Mich.
Airmaster Corp., Chicago, Ill.
Allen Ventilator Div., Production Planning Co., Rochester, Mich.
● American Blower Corp., Detroit, Mich.
American Coolair Corp., Jacksonville, Fla.
Bar-Brook Mfg. Co., Inc., Shreveport, La.
Belter Electric Mfg. Co., G. J., The, St. Louis, Mo.
Bern's Mfg. Co., Chicago, Ill.
Binks Mfg. Co., Chicago, Ill.
● Bishop & Babcock Mfg. Co., Cleveland, O.
Broan Mfg. Co., Inc., Milwaukee, Wis.
● Buffalo Forge Co., Buffalo, N. Y.
C & H Air Conditioning Fan Co., Inc., Atlanta, Ga.
Campbell Heating Co., E. K., Kansas City, Mo.
Carling Turbine Blower Co., Worcester, Mass.
Century Fan & Ventilator Co., Stamford, Conn.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., Inc., Irvington, N. Y.
Chicago Blower Corp., Chicago, Ill.
Chicago Fan & Fin Coil Co., Chicago, Ill.
Circulators & Devices Mfg. Corp., New York, N. Y.
● Clarage Fan Co., Kalamazoo, Mich.
Coppus Engineering Corp., Worcester, Mass.
Dana Fan & Blower Corp., Cincinnati, O.
● De Bothezat Fans Div., American Machine & Metals, Inc., New York, N. Y.
DeVilbiss Co., The, Toledo, O.
Diehl Mfg. Co., Somerville, N. J.
Dual-Air Fan Co., South Elgin, Ill.
Dynamic Air Engineering, Inc., Los Angeles, Calif.
Eastern Air Devices, Inc., Brooklyn, N. Y.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Emerson Electric Mfg. Co., The, St. Louis, Mo.
FASCO Industries, Inc., Rochester, N. Y.
Garden City Fan Co., Chicago, Ill.
● General Blower Co., Morton Grove, Ill.
Goettl Bros. Metal Prod. Inc., Phoenix, Ariz.
Guth Co., Edwin F., St. Louis, Mo.
Hartzell Propeller Fan Co., Piqua, O.
Holcomb & Hoke Mfg. Co., Inc., Indianapolis, Ind.
Holtum Mfg. Co., Freeport, Ill.
Hunter Fan & Ventilating Co., Inc., Memphis, Tenn.
Ilg Electric Ventilating Co., Chicago, Ill.
Indiana Fan Co., Indianapolis, Ind.
International Engineering, Inc., Dayton, O.
Jamieson Mfg. Co., Dallas, Tex.
Jeffrey Mfg. Co., Columbus, O.
Jenn Air Products Co., Indianapolis, Ind.
Jordan & Co., Inc., Paul R., Indianapolis, Ind.
● Joy Mfg. Co., Pittsburgh, Pa.
Kernchen Co., Chicago, Ill.
● King Co., The, Owatonna, Minn.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Lau Blower Co., Dayton, O.
Marathon Electric Mfg. Corp., Wausau, Wis.
Martin Fan & Blower Co., Chicago, Ill.
McLarty Systems, Battle Creek, Mich.
Meier Electric & Machine Co., Inc., Indianapolis, Ind.
● Moore Co., The, Marceline, Mo.
Motionair Co., Los Angeles, Calif.
Mountain States Equipment Co., Denver, Colo.
Muckle Mfg. Co., Owatonna, Minn.
Myers Electric Co., Inc., Pittsburgh, Pa.
National Engineering & Mfg. Co., Kansas City, Mo.
National Gas Equipment Co., Inc., Terrell, Tex.
● Nelson Corp., Herman, Moline, Ill.
● New York Blower Co., Chicago, Ill.
Peerless Electric Co., Warren, O. (Disc)
Perkins & Son, Inc., B. F., Holyoke, Mass.
Phelps Mfg. Co., Little Rock, Ark.
● Pritchard & Co., J. F., Kansas City, Mo.
● Propellair Div., Robbins & Myers, Inc., Springfield, O.
Reed Unit-Fans, Inc., New Orleans, La.
Reynolds Electric Co., River Grove, Ill.
St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Schwitzer-Cummins Co., Indianapolis, Ind.
Scott-Newcomb, Inc., St. Louis, Mo.
Sensenich Corp., Lancaster, Pa.
Signal Electric Mfg. Co., Menominee, Mich.
Somers, Inc., H. J., Detroit, Mich.
● South Bend Air Products, Inc., South Bend, Ind.
Standard Electric Mfg. Co., West Berlin, N. J.
Sutton Corp., O. A., Wichita, Kan.
Swift Mfg. Co., Inc., Hazel Park, Mich.
Thermal Industries, Indio, Calif.
Trade-Wind Motorfans, Inc., Los Angeles, Calif.

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● Trane Co., The, LaCrosse, Wis.
Truflo Fan Co., Harmony, Pa.
● Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
● United States Air Conditioning Corp., Minneapolis, Minn.
Utility Appliance Corp., Los Angeles, Calif.
Victor Electric Products, Inc., Cincinnati, O.
Viking Air Conditioning Corp., Cleveland, O.
Western Blower Co., Seattle, Wash.
Western Engineering & Mfg. Co., Los Angeles, Calif.
Wind-Way Fan & Ventilating Co., New Orleans, La.

FASTENERS, INSULATION

Devices, Inc., New York, N. Y.
Dzus Fastener Co., Inc., Babylon, N. Y.
Lexington Supply Co., Cleveland, O.
Moore, Inc., Goodloe, E., Danville, Ill.
● Stemco Corp., The, Rocky River, O.
Stic-Klip Mfg. Co., Cambridge, Mass.
Tinnerman Products, Inc., Cleveland, O.

FEEDERS, CHEMICAL, PROPORTIONING

American Water Softener Co., Philadelphia, Pa.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Bogue Electric Co., Paterson, N. J.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Elgin Softener Corp., Elgin, Ill.
Fischer & Porter Co., Hatboro, Pa.
Fuller Co., Catasauqua, Pa.
Graver Water Conditioning Co., New York, N. Y.
Haering & Co., Inc., D. W., Chicago, Ill.
Jeffrey Mfg. Co., Columbus, O.
National Aluminate Corp., Chicago, Ill.
% Proportioneers, Inc. %, Providence, R. I.
Permutit Co., New York, N. Y.
Roy Co., Milton, Philadelphia, Pa.
Sprout, Waldron & Co., Muncy, Pa.
● Stephens-Adamson Mfg. Co., Aurora, Ill.
Syntron Co., Homer City, Pa.
Wallace & Tiernan Co., Inc., Newark, N. J.

FEEDERS, WATER, HEATING BOILER

Bailey Co., Chas. M., San Francisco, Calif.
Campbell Co., J. A., Long Beach, Calif.
Cissell Mfg. Co., Inc., W. M., Louisville, Ky.
Davis Regulator Co., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
● General Controls Co., Glendale, Cal.
Jacuzzi Bros., Inc., Richmond, Calif.
Johnson Corp., The, Three Rivers, Mich.
Kieley & Mueller, Inc., North Bergen, N. J.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Magnetrol, Inc., Chicago, Ill.
● Maid-O'-Mist, Inc., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
Morehead Mfg. Co., Detroit, Mich.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Nason Co., Detroit, Mich.
Newark Boiler Regulator Co., Inc., Bloomfield, N. J.
Penn Electric Switch Co., Goshen, Ind.
Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
Sterling Engineering & Mfg. Corp., Hyde Park, Mass.
Templeton Bros., Hyde Park, Mass.
Watts Regulator Co., Lawrence, Mass.
● Webster & Co., Warren, Camden, N. J.

FEEDWATER HEATERS

See Deaerators

FIBER PACKING

See Packing, Fiber

FIBER PIPE

See Pipe, Fiber

FILTER GAGES

See Gages, Air Filter

FILTERS, AIR, AUTOMATIC

Air-Stream Filter Corp., St. Louis, Mo.
● American Air Filter Co., Inc., Louisville, Ky.
● Continental Air Filters, Inc., Louisville, Ky.
● Dollinger Corp., Rochester, N. Y.
● Farr Co., Los Angeles, Calif.
Ruemelin Mfg. Co., Milwaukee, Wis.

FILTERS, AIR, ELECTRIC

See Cleaners, Air, Electrical

FILTERS, AIR, GREASE

● Air Devices, Inc., New York, N. Y.
Air Filter Corp., Milwaukee, Wis.
Air-Maze Corp., Cleveland, O.
● American Air Filter Co., Inc., Louisville, Ky.
● Continental Air Filters, Inc., Louisville, Ky.
● Dollinger Corp., Rochester, N. Y.
● Farr Co., Los Angeles, Calif.
Filtair Mfg. Co., San Francisco, Calif.
● Research Products Corp., Madison, Wis.

FILTERS, AIR, UNIT, CLEANABLE

● Air Devices, Inc., New York, N. Y.
Air Filter Corp., Milwaukee, Wis.
Air-Maze Corp., Cleveland, O.
Air-Stream Filter Corp., St. Louis, Mo.
● American Air Filter Co., Inc., Louisville, Ky.
Carey Electronic Engineering Co., Metal Wool Div., Springfield, O.
Chicago Filter Co., Joliet, Ill.
● Continental Air Filters, Inc., Louisville, Ky.
Coppus Engineering Corp., Worcester, Mass.
● Dollinger Corp., Rochester, N. Y.
● Farr Co., Los Angeles, Calif.
Kauffman Air Conditioning Corp., St. Louis, Mo.
● Research Products Corp., Madison, Wis.
Somers, Inc., H. J., Detroit, Mich.
Supreme Air Filter Co., New York, N. Y.
Universal Air Filter Corp., Duluth, Minn.

FILTERS, AIR, UNIT, RENEWABLE MEDIA

● American Air Filter Co., Inc., Louisville, Ky.
● Dollinger Corp., Rochester, N. Y.
● Glasfloss Corp., New York, N. Y.

FILTERS, AIR, UNIT, THROW-AWAY

● American Air Filter Co., Inc., Louisville, Ky.
Blocksom & Co., Michigan City, Ind.
Chicago Filter Co., Joliet, Ill.
Drico Industrial Corp., New York, N. Y.
● Glasfloss Corp., New York, N. Y.
Morf Industries, Inc., Staten Island, N. Y.
● Owens-Corning Fiberglas Corp., Toledo, O.
● Research Products Corp., Madison, Wis.
Smith Co., O. F., Moline, Ill.
Universal Air Filter Corp., Duluth, Minn.
● Wilson & Co., Inc., Chicago, Ill.

FILTERS, AIR, ELECTRIC

See Cleaners, Air, Electrical

FILTERS, ODOR

See Adsorbers, Odor

FILTERS, PIPE LINE

Adams Co., Inc., R. P., Buffalo, N. Y.
Air-Maze Corp., Cleveland, O.
● Alco Valve Co., St. Louis, Mo.
● American Air Filter Co., Inc., Louisville, Ky.
American Cyanamid & Chemical Corp., New York, N. Y.
American Locomotive Co., Alco Products Div., New York, N. Y.
Andale Co., Philadelphia, Pa.
Bowser, Inc., Fort Wayne, Ind.
CCA Products, Inc., Glendale, Calif.
Champion Laboratories, Inc., Meriden, Conn.
Cleveland Humidifier Co., Cleveland, O.
Commercial Filters Corp., Boston, Mass.
Conoflow Corp., Philadelphia, Pa.
Cuno Engineering Corp., Meriden, Conn.
DeVilbiss Co., The, Toledo, O.
● Dollinger Corp., Rochester, N. Y.
Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
● Fisher Governor Co., Marshalltown, Ia.
Fram Corp., Providence, R. I.
Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
General Filters, Inc., Detroit, Mich.
Johnson Corp., The, Three Rivers, Mich.
Kaye & MacDonald, Inc., West Orange, N. J.
Kraissl Co., Inc., The, Hackensack, N. J.
Logan Engineering Co., Chicago, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
Moraine Products Div., General Motors Corp., Dayton, O. (Porous metal)
Morse-Smith-Morse, Inc., Watertown, Mass.
Newark Wire Cloth Co., Newark, N. J.
Norgren Co., C. A., Denver, Colo.
Patrol Valve Co., The, Cleveland, O.
Permutit Co., New York, N. Y.
Rega Mfg. Co., Rochester, N. Y.
Scientific Instrument Co., Detroit, Mich.
Standard Machine & Mfg. Co., St. Louis, Mo.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Trerice Co., Detroit, Mich.
W. G. B. Oil Clarifier, Inc., Kingston, N. Y. (for fuel oil)
Warner Lewis Co., Tulsa, Okla.
Winslow Engineering Co., Oakland, Calif.
Worthington Pump & Machinery Corp., Harrison, N. J.

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FILTERS, REFRIGERANT

● Alco Valve Co., St. Louis, Mo.
Automatic Products Co., Milwaukee, Wis.
Commercial Filters Corp., Boston, Mass.
● Dollinger Corp., Rochester, N. Y.
General Filter Co., Ames, Ia.
● Henry Valve Co., Melrose Park, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
McIntire Connector Co., Newark, N. J.
Moraine Products Div., General Motors Corp., Dayton, O. (Porous metal)
Mueller Brass Co., Port Huron, Mich.
Newark Wire Cloth Co., Newark, N. J.
Phillips & Co., H. A., Chicago, Ill.
Remco, Inc., Zelienople, Pa.
● Sporlan Valve Co., St. Louis, Mo.
Standard Machine & Mfg. Co., St. Louis, Mo.
Wabash Mfg. Co., Chicago, Ill.
Weatherhead Co., Cleveland, O.

FILTERS, WATER

Adams Co., Inc., R. P., Buffalo, N. Y.
● Alco Valve Co., St. Louis, Mo.
American Cyanamid & Chemical Corp., New York, N. Y.
American Water Softener Co., Philadelphia, Pa.
American Well Works, Aurora, Ill.
Aqua-Mist Co., Topeka, Kan. (Aspenwood fibre)
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Bowser, Inc., Fort Wayne, Ind.
Cochrane Corp., Philadelphia, Pa.
Commercial Filters Corp., Boston, Mass.
● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Cuno Engineering Corp., Meriden, Conn.
● Dollinger Corp., Rochester, N. Y.
Duro Co., Dayton, O.
Elgin Softener Corp., Elgin, Ill.
Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
Graver Water Conditioning Co., New York, N. Y.
Greer Hydraulics, Inc., Brooklyn, N. Y.
● Henry Valve Co., Melrose Park, Ill.
Kaye & MacDonald, Inc., West Orange, N. J.
Liquid Conditioning Corp., Philadelphia, Pa.
Newark Wire Cloth Co., Newark, N. J.
Norwood Filtration Co., The, Holyoke, Mass.
% Proportioneers, Inc. %, Providence, R. I.
Permutit Co., New York, N. Y.
Red Jacket Mfg. Co., Davenport, Ia.
Refinite Corp., Omaha, Neb.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Winslow Engineering Co., Oakland, Calif.
Worthington Pump & Machinery Corp., Harrison, N. J.

FINNED TUBING

See Tubing, Finned

FIRE PUMPS

See Pumps, Fire

FITTINGS, BLOW PIPE

Ajax Furnace Fitting Co., Div. of Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Allington & Curtis Mfg. Co., Saginaw, Mich.
Chicago Metal Mfg. Co., Chicago, Ill.
Day Co., The, Minneapolis, Minn.
Goethel Sheet Metal Works, Alfred, Milwaukee, Wis.
Kirk & Blum Mfg. Co., Cincinnati, O.
Mahon Co., R. C., Detroit, Mich.
● National Metal Fabricators, Chicago, Ill.
Newcomb-Detroit Co., Detroit, Mich.
Northern Blower Co., Cleveland, O.
Peters-Dalton, Inc., Detroit, Mich.
Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Schmieg Inudustries, Detroit, Mich.
Tiffin Eaves Trough Clamp Co., Tiffin, O.
United States Register Co., Battle Creek, Mich.
Winkler & Sons, Inc., A. E., Milwaukee, Wis.
Young & Bertke Co., Cincinnati, O.

FITTINGS, COPPER TUBE, COMPRESSION

American Brass Co., Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Commonwealth Brass Corp., Detroit, Mich.
● Couplings Co., Chicago, Ill.
● Dole Valve Co., The, Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Everhot Products Co., Chicago, Ill.
Gustin Bacon Mfg. Co., Kansas City, Mo.
Hays Mfg. Co., Erie, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Oil Equipment Mfg. Corp., New Haven, Conn.
Parker Appliance Co., The, Cleveland, O.
Wabash Mfg. Co., Chicago, Ill.
Weatherhead Co., Cleveland, O.

FITTINGS, COPPER TUBE, FLARED

Acheson Mfg. Co., Rankin, Pa.
American Brass Co., Waterbury, Conn.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Commonwealth Brass Corp., Detroit, Mich.
● Couplings Co., Chicago, Ill.
● Dole Valve Co., The, Chicago, Ill.
Everhot Products Co., Chicago, Ill.
● Grinnell Co., Inc., Providence, R. I.
Hays Mfg. Co., Erie, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
Oil Equipment Mfg. Corp., New Haven, Conn.
Packless Metal Products Corp., New Rochelle, N. Y.
Parker Appliance Co., The, Cleveland, O.
Phoenix Brass Fittings Corp., Irvington, N. J.
Remco, Inc., Zelienople, Pa.
Scovill Mfg. Co., Waterbury, Conn.
Truetite Corp., The, Bridgeport, Conn.
Weatherhead Co., Cleveland, O.

FITTINGS, COPPER TUBE, SOLDER

Acheson Mfg. Co., Rankin, Pa.
American Brass Co., Waterbury, Conn.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Commonwealth Brass Corp., Detroit, Mich.
● Crane Co., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
General Fittings Co., Providence, R. I.
Grabler Mfg. Co., Cleveland, O.
Hammond Brass Works, Hammond, Ind.
Lewin-Mathes Co., Lewin Metals Div., St. Louis, Mo.
Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
Phoenix Brass Fittings Corp., Irvington, N. J.
Union Metal Works, Chelsea, Mass.
● Walworth Co., New York, N. Y. (Brazed)

FITTINGS, DRAINAGE, FIXED AIR BREAK

American Sterilizer Co., Erie, Pa.
● Crane Co., Chicago, Ill.
Ohio Chemical & Mfg. Co., The, Madison, Wis.
Semler Co., Jeannette, Pa.

FITTINGS, HOT WATER HEATING SYSTEMS, ONE PIPE

Autostributor Co., Lansing, Mich. (manifold for connecting radiator branches)
● Bell & Gossett Co., Morton Grove, Ill.
● Gold Top Heating, Inc., Butte, Mont.
Kehm Corp., The, Chicago, Ill.
Mel Products Co., The, New Haven, Conn.
Sall Bros. Co., Rockford, Ill.
Semler Co., Jeannette, Pa.
Taco Heaters, Inc., Providence, R. I.
● Thrush & Co., H. A., Peru, Ind.
● Trane Co., The, LaCrosse, Wis.
Triplex Heating Specialty Co., Inc., Peru, Ind.
W-H Engineering Co., Chicago, Ill.

FITTINGS, LINED

American Hard Rubber Co., New York, N. Y. (Rubber)
Cement Lined Pipe Co., Lynn, Mass. (Lead and tin)
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Gates Engineering Co., Wilmington, Del.
Goodrich Co., B. F., Akron, O. (Rubber)
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead and tin)
Michigan Pipe Co., Bay City, Mich. (Wood)
National Lead Co., New York, N. Y. (Lead)
Northern Indiana Brass Co., Elkhart, Ind. (Tinned)
Raybestos-Manhattan, Inc., Passaic, N. J. (Rubber)
Resisto Pipe & Valve Co., East Cambridge, Mass.
United States Rubber Co., New York, N. Y. (Rubber)
Warren Foundry & Pipe Corp., New York, N. Y. (cement)

FITTINGS, PIPE, BRASS, THREADED

Acheson Mfg. Co., Rankin, Pa.
American Manganese Bronze Co., Philadelphia, Pa.
Belfield Valve Div. of Minneapolis-Honeywell, Philadelphia, Pa.
Bowser, Inc., Fort Wayne, Ind.
Chase Brass & Copper Co., Waterbury, Conn.
Commonwealth Brass Corp., Detroit, Mich.
● Couplings Co., The, Chicago, Ill.
● Crane Co., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Gilbert Brass Foundry Co., St. Louis, Mo.
● Grinnell Co., Inc., Providence, R. I.

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Imperial Brass Mfg. Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
Kennedy Valve Mfg. Co., Elmira, N. Y.
● Lunkenheimer Co., Cincinnati, O.
New York Brass Fdry., New York, N. Y.
Parker Appliance Co., Cleveland, O.
Penn Mfg. Corp., of Washington, Pa., Washington, Pa.
Phoenix Brass Fittings Corp., Irvington, N. J.
U. S. Plug & Fitting Co., Cleveland, O. (pipe plugs)
Union Metal Wks., Chelsea, Mass.
● Walworth Co., New York, N. Y.

FITTINGS, PIPE, BRASS, WELDING

Chase Brass & Copper Co., Waterbury, Conn.
● Ladish Co., Cudahy, Wis.
● Midwest Piping & Supply Co., Inc., St. Louis, Mo.
● Tube Turns, Inc., Louisville, Ky.
● Walworth Co., New York., N. Y. (Brazed)

FITTINGS, PIPE, BRONZE, BRAZED

Chase Brass & Copper Co., Waterbury, Conn.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Union Metal Works, Chelsea, Mass.
● Walworth Co., New York, N. Y.

FITTINGS, PIPE, BRONZE, SOLDER

Acheson Mfg. Co., Rankin, Pa.
American Brass Co., Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
● Crane Co., Chicago, Ill.
Everhot Products Co., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
General Fittings Co., Providence, R. I.
Gilbert Brass Foundry Co., St. Louis, Mo.
Lewin-Mathes Co., Lewin Metals Div., St. Louis, Mo.
Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
Union Malleable Mfg. Co., Ashland, O.
Union Metal Works, Chelsea, Mass.

FITTINGS, PIPE, CAST IRON, FLANGED

Alabama Pipe Co., Anniston, Ala.
American Cast Iron Pipe Co., Birmingham, Ala.
Clow & Sons, James B., Chicago, Ill.
● Crane Co., Chicago, Ill.
● Duriron Co., Inc., Dayton, O. (Acid resisting)
Flori Pipe Co., The, St. Louis, Mo.
● Frick Co., Waynesboro, Pa.
● Grinnell Co., Inc., Providence, R. I.
Jarecki Mfg. Co., Erie, Pa.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Kuhns Bros. Co., Dayton, O.
Lynchburg Foundry Co., Lynchburg, Va.
Malleable Iron Fittings Co., Branford, Conn.
National Valve & Mfg. Co., Pittsburgh, Pa.
Parks-Cramer Co., Fitchburg, Mass. (Jacketed)
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Semler Co., Jeannette, Pa.
Stockham Valves & Fittings, Birmingham, Ala.
Straight Line Foundry & Machine Corp., Direct Separator Div., The, Syracuse, N. Y.
United States Pipe & Foundry Co., Burlington, N. J.
● Walworth Co., New York, N. Y.
Warren Foundry & Pipe Corp., New York, N. Y.

FITTINGS, PIPE, CAST IRON, THREADED

Clow & Sons, James B., Chicago, Ill.
● Crane Co., Chicago, Ill.
Detroit Brass & Malleable Wks., Detroit, Mich.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Flori Pipe Co., The, St. Louis, Mo.
● Frick Co., Waynesboro, Pa.
Grabler Mfg. Co., Cleveland, O.
● Grinnell Co., Inc., Providence, R. I.
Illinois Malleable Iron Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
Kuhns Bros. Co., Dayton, O.
Malleable Iron Fittings Co., Branford, Conn.
Ravena Iron Co., Ravena, N. Y.
Semler Co., Jeannette, Pa.
Somerville Iron Works, Somerville, N. J.
Stockham Valves & Fittings, Birmingham, Ala.
U. S. Plug & Fitting Co., Cleveland, O. (pipe plugs)
● Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.

FITTINGS, PIPE, COMPRESSION

Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Hays Mfg. Co., Erie, Pa.
Patrol Valve Co., The, Cleveland, O.

FITTINGS, PIPE, HARD RUBBER

American Hard Rubber Co., New York, N. Y.
Goodrich Co., B. F., Akron, O.
Luzerne Rubber Co., Trenton, N. J.
Raybestos-Manhattan, Inc., Passaic, N. J.
Stokes Molded Products, Inc., Trenton, N. J.
United States Rubber Co., New York, N. Y.

FITTINGS, PIPE, LEAD

Alpha Metals, Inc., Brooklyn, N. Y.
Eagle Picher Co., Cincinnati, O.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Flemm Lead Co., Inc., Long Island City, N. Y.
Lead Lined Iron Pipe Co., Wakefield, Mass.
Lissberger & Son, Inc., Marks, Long Island City, N. Y.
National Lead Co., New York, N. Y.
Northwest Lead Co., Seattle, Wash.
Resisto Pipe & Valve Co., East Cambridge, Mass.
Rochester Lead Works, Inc., Rochester, N. Y.

FITTINGS, PIPE, MALLEABLE

Corley Co., Inc., The, Jersey City, N. J.
● Crane Co., Chicago, Ill.
Detroit Brass & Malleable Wks., Detroit, Mich.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Flori Pipe Co., The, St. Louis, Mo.
Grabler Mfg. Co., Cleveland, O.
● Grinnell Co., Inc., Providence, R. I.
Illinois Malleable Iron Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Malleable Iron Fittings Co., Branford, Conn.
Pittsburgh Valve & Fittings Co., Barberton, O.
Rhode Island Fittings Co., Providence, R. I.
Stockham Valves & Fittings, Birmingham, Ala.
Union Malleable Mfg. Co., Ashland, O.
● Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.

FITTINGS, PIPE, MALLEABLE, BRAZED

Flagg & Co., Inc., Stanley G., Philadelphia, Pa.

FITTINGS, PIPE, NICKEL AND NICKEL ALLOY

Alloy Steel Products Co., Linden, N. J.
American Manganese Bronze Co., Philadelphia, Pa.
Cooper Alloy Foundry Co., The, Hillside, N. J.
● Crane Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
Hasco Valve & Machine Co., Milwaukee, Wis.
International Nickel Co., Inc., The, New York, N. Y.
● Ladish Co., Cudahy, Wis.
Northern Indiana Brass Co., Elkhart, Ind.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
● Taylor Forge & Pipe Wks., Chicago, Ill.
Tri-Clover Machine Co., Kenosha, Wis.
● Tube Turns, Inc., Louisville, Ky.
● Walworth Co., New York, N. Y.
Warren Foundry & Pipe Corp., New York, N. Y.
● Watson-Stillman Co., Roselle, N. J.

FITTINGS, PIPE, PLASTIC

Acadia Synthetic Products Div., Western Felt Works, Chicago, Ill.
American Hard Rubber Co., New York, N. Y.
Commercial Plastics Co., Chicago, Ill.
Continental-Diamond Fibre Co., Newark, Del.
Haveg Corp., Newark, Del.
Mills Corp., Elmer E., Chicago, Ill.
North Penn Co., New York, N. Y.
Parker Appliance Co., The, Cleveland, O.
United States Stoneware Co., New York, N. Y.
Yardley Plastics Co., Columbus, O.

FITTINGS, PIPE, SANITARY

Tri-Clover Machine Co., Kenosha, Wis.

FITTINGS, PIPE, STAINLESS STEEL

Alloy Steel Products Co., Linden, N. J.
Cooper Alloy Foundry Co., The, Hillside, N. J.
● Crane Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
J O Mfg. Co., South Gate, Calif.
● Ladish Co., Cudahy, Wis.
Northern Indiana Brass Co., Elkhart, Ind.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
● Taylor Forge & Pipe Wks., Chicago, Ill.
Tri-Clover Machine Co., Kenosha, Wis.
● Tube Turns, Inc., Louisville, Ky.
● Walworth Co., New York, N. Y.
● Watson-Stillman Co., Roselle, N. J.
● Welding Fittings Corp., New Castle, Pa.

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FITTINGS, PIPE, STEEL, FLANGED

Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
● Bonney Forge & Tool Works, Allentown, Pa.
● Crane Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
● Frick Co., Waynesboro, Pa.
Kerotest Mfg. Co., Pittsburgh, Pa.
National Valve & Mfg. Co., Pittsburgh, Pa.
● Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Semet-Solvay Engrg. Div., Allied Chemical & Dye Corp., New York, N. Y.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.

FITTINGS, PIPE, STEEL, FORGED, THREADED

● Bonney Forge & Tool Works, Allentown, Pa.
Catawissa Valve & Fittings Co., Catawissa, Pa.
● Crane Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
● Henry Valve Co., Melrose Park, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
● Ladish Co., Cudahy, Wis.
Larkin Packer Co., St. Louis, Mo.
Union Malleable Mfg. Co., Ashland, O.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
● Watson-Stillman Co., Roselle, N. J.

FITTINGS, PIPE, STEEL, SOCKET WELD

● Bonney Forge & Tool Works, Allentown, Pa.
Catawissa Valve & Fittings Co., Catawissa, Pa.
● Crane Co., Chicago, Ill.
DAS Div. of Defiance Automatic Screw Co., Defiance, O.
Flori Pipe Co., The, St. Louis, Mo.
● Ladish Co., Cudahy, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
● Watson-Stillman Co., Roselle, N. J.

FITTINGS, PIPE, STEEL, THREADED

● Bonney Forge & Tool Works, Allentown, Pa.
Capitol Mfg. & Supply Co., Columbus, O.
Catawissa Valve & Fittings Co., Catawissa, Pa.
● Crane Co., Chicago, Ill.
DAS Div. of Defiance Automatic Screw Co., Defiance, O.
Flori Pipe Co., The, St. Louis, Mo.
Gustin Bacon Mfg. Co., Kansas City, Mo.
Harrisburg Steel Corp., Harrisburg, Pa.
Hasco Valve & Machine Co., Milwaukee, Wis.
● Ladish Co., Cudahy, Wis.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
● Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Tubing Seal-Cap, Inc., Los Angeles, Calif. (plugs and caps)
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
● Watson-Stillman Co., Roselle, N. J.

FITTINGS, PIPE, STEEL, WELDING

Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
● Bonney Forge & Tool Works, Allentown, Pa.
Catawissa Valve & Fittings Co., Catawissa, Pa.
● Crane Co., Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Flori Pipe Co., The, St. Louis, Mo.
Globe Steel Tubes Co., Milwaukee, Wis.
● Grinnell Co., Inc., Providence, R. I.
Gustin Bacon Mfg. Co., Kansas City, Mo.
● Ladish Co., Cudahy, Wis.
Larkin Packer Co., St. Louis, Mo.
Lumsden & Van Stone Co., Div. of Midwest Piping & Supply Co., South Boston, Mass.
● Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
● Taylor Forge & Pipe Wks., Chicago, Ill.
Tri-Clover Machine Co., Kenosha, Wis.
● Tube Turns, Inc., Louisville, Ky.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
● Welding Fittings Corp., New Castle, Pa.

FITTINGS, PIPE, WROUGHT IRON, WELDING

● Bonney Forge & Tool Works, Allentown, Pa.
Flori Pipe Co., The, St. Louis, Mo.
Gustin Bacon Mfg. Co., Kansas City, Mo.
● Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
● Taylor Forge & Pipe Wks., Chicago, Ill.
● Tube Turns, Inc., Louisville, Ky.
● Walworth Co., New York, N. Y.

FITTINGS, REFRIGERATION

Aeroquip Corp., Jackson, Mich.
Aminco Refrigeration Products Co., Detroit, Mich.
Baker Refrigeration Corp., South Windham, Me.
Chase Brass & Copper Co., Waterbury, Conn.
Commonwealth Brass Corp., Detroit, Mich.
● Crane Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
● Frick Co., Waynesboro, Pa.
Hays Mfg. Co., Erie, Pa.
● Henry Valve Co., Melrose Park, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
● Ladish Co., Cudahy, Wis.
Madden Brass Products Co., The, Chicago, Ill.
Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
Remco, Inc., Zelienople, Pa.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Wabash Mfg. Co., Chicago, Ill.
● Watson-Stillman Co., Roselle, N. J.
Weatherhead Co., Cleveland, O.
Wittenmeier Machinery Co., Chicago, Ill.
Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Inc., Chicago, Ill.
● York Corp., York, Pa.

FITTINGS, STEEL TUBE, FLARED

● Couplings Co., Chicago, Ill.
● Grinnell Co., Inc., Providence, R. I.
Imperial Brass Mfg. Co., Chicago, Ill.
Parker Appliance Co., The, Cleveland, O.
● York Corp., York, Pa.

FLAME CONTROLS

See Controls, Flame Failure

FLANGE BOLTS

See Bolts and Studs, Flange

FLANGE SEPARATORS

See Separators, Flange

FLANGES, ORIFICE

Barton Instrument Co., Los Angeles, Calif.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Conoflow Corp., Philadelphia, Pa.
Flori Pipe Co., The, St. Louis, Mo.
Foxboro Co., Foxboro, Mass.
● Ladish Co., Cudahy, Wis.
Meriam Instrument Co., The, Cleveland, O.
Pennsylvania Forge Co., Philadelphia, Pa.
Phoenix Mfg. Co., Joliet, Ill.
● Taylor Forge & Pipe Wks., Chicago, Ill.
Trimount Instrument Co., Chicago, Ill.
● Tube Turns, Inc., Louisville, Ky.
● Walworth Co., New York, N. Y.

FLANGES, PIPE, ALLOY STEEL, LAP JOINT

Alloy Steel Products Co., Linden, N. J.
Cooper Alloy Foundry Co., The, Hillside, N. J.
● Crane Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
Harrisburg Steel Corp., Harrisburg, Pa.
Hasco Valve & Machine Co., Milwaukee, Wis.
● Ladish Co., Cudahy, Wis.
● Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
Phoenix Mfg. Co., Joliet, Ill.
Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
● Taylor Forge & Pipe Works, Chicago, Ill.
● Tube Turns, Inc., Louisville, Ky.
● Walworth Co., New York, N. Y.

FLANGES, PIPE, ALLOY STEEL, SCREWED

Alloy Steel Products Co., Linden, N. J.
Cooper Alloy Foundry Co., The, Hillside, N. J.
● Crane Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
Harrisburg Steel Corp., Harrisburg, Pa.
Hasco Valve & Machine Co., Milwaukee, Wis.
● Ladish Co., Cudahy, Wis.
● Midwest Piping & Supply Co., Inc., St. Louis, Mo.

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National Valve & Mfg. Co., Pittsburgh, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
Phoenix Mfg. Co., Joliet, Ill.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
● Taylor Forge & Pipe Works, Chicago, Ill.
● Tube Turns, Inc., Louisville, Ky.
● Walworth Co., New York, N. Y.
● Watson-Stillman Co., Roselle, N. J.

FLANGES, PIPE, ALLOY STEEL, WELDING

Cooper Alloy Foundry Co., Hillside, N. J.
● Crane Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
Harrisburg Steel Corp., Harrisburg, Pa.
Hasco Valve & Machine Co., Milwaukee, Wis.
● Ladish Co., Cudahy, Wis.
● Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
Phoenix Mfg. Co., Joliet, Ill.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
● Taylor Forge & Pipe Works, Chicago, Ill.
● Tube Turns, Inc., Louisville, Ky.
● Walworth Co., New York, N. Y.
● Welding Fittings Corp., New Castle, Pa.

FLANGES, PIPE, BRASS, SCREWED

Acheson Mfg. Co., Rankin, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Conoflow Corp., Philadelphia, Pa.
● Crane Co., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Providence, R. I.
Jarecki Mfg. Co., Erie, Pa.
● Ladish Co., Cudahy, Wis.
National Valve & Mfg. Co., Pittsburgh, Pa.
Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
Quaker City Iron Wks., Philadelphia, Pa.
Union Metal Works, Chelsea, Mass.
● Walworth Co., New York, N. Y.

FLANGES, PIPE, CAST IRON, SCREWED

Clow & Sons, James B., Chicago, Ill.
● Crane Co., Chicago, Ill.
Detroit Brass & Malleable Works, Detroit, Mich.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Flori Pipe Co., The, St. Louis, Mo.
● Grinnell Co., Inc., Providence, R. I.
Jarecki Mfg. Co., Erie, Pa.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Kuhns Bros. Co., Dayton, O.
Lynchburg Foundry Co., Lynchburg, Va.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
Ravena Iron Co., Ravena, N. Y.
Semler Co., Jeannette, Pa.
Stockham Valves & Fittings, Birmingham, Ala.
Straight Line Foundry & Machine Corp., Direct Separator Div., Syracuse, N. Y.
U. S. Plug & Fitting Co., Cleveland, O.
● Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
Warren Foundry & Pipe Corp., New York, N. Y.

FLANGES, PIPE, MALLEABLE IRON, SCREWED

Baker Refrigeration Corp., South Windham, Me.
● Crane Co., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Flori Pipe Co., The, St. Louis, Mo.
Grabler Mfg. Co., Cleveland, O.
● Grinnell Co., Inc., Providence, R. I.
National Valve & Mfg. Co., Pittsburgh, Pa.
Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
● Walworth Co., New York, N. Y.

FLANGES, PIPE, NICKEL AND NICKEL ALLOY

Cooper Alloy Foundry Co., The, Hillside, N. J.
● Crane Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
Hasco Valve & Machine Co., Milwaukee, Wis.
● Ladish Co., Cudahy, Wis.
Pennsylvania Forge Co., Philadelphia, Pa.
Phoenix Mfg. Co., Joliet, Ill.
● Taylor Forge & Pipe Wks., Chicago, Ill.
Tri-Clover Machine Co., Kenosha, Wis.
● Walworth Co., New York, N. Y.

FLANGES, PIPE, STEEL, LAP JOINT

Chicago Metal Mfg. Co., Chicago, Ill.
● Crane Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
● Grinnell Co., Inc., Providence, R. I.
Harrisburg Steel Corp., Harrisburg, Pa.
● Ladish Co., Cudahy, Wis.
Lumsden & Van Stone Co., Div. of Midwest Piping & Supply Co., South Boston, Mass.
● Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
Phoenix Mfg. Co., Joliet, Ill.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
● Taylor Forge & Pipe Works, Chicago, Ill.
● Tube Turns, Inc., Louisville, Ky.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.

FLANGES, PIPE, STEEL, SCREWED

● Crane Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
G & H Mfg. Co., Philadelphia, Pa.
Harrisburg Steel Corp., Harrisburg, Pa.
● Henry Valve Co., Melrose Park, Ill.
Hubbell Corp., Chicago, Ill.
● Ladish Co., Cudahy, Wis.
Lumsden & Van Stone Co., Div. of Midwest Piping & Supply Co., South Boston, Mass.
● Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
Phoenix Mfg. Co., Joliet, Ill.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
● Taylor Forge & Pipe Works, Chicago, Ill.
● Tube Turns, Inc., Louisville, Ky.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
● Watson-Stillman Co., Roselle, N. J.

FLANGES, PIPE, STEEL, WELDING

Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
● Bonney Forge & Tool Works, Allentown, Pa.
● Crane Co., Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Flori Pipe Co., The, St. Louis, Mo.
Harrisburg Steel Corp., Harrisburg, Pa.
● Henry Valve Co., Melrose Park, Ill.
Hubbell Corp., Chicago, Ill.
● Ladish Co., Cudahy, Wis.
Lumsden & Van Stone Co., Div. of Midwest Piping & Supply Co., South Boston, Mass.
● Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Naylor Pipe Co., Chicago, Ill.
Pennsylvania Forge Co., Philadelphia, Pa.
Phoenix Mfg. Co., Joliet, Ill.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
Roessing Mfg. Co., Pittsburgh, Pa.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
● Taylor Forge & Pipe Works, Chicago, Ill.
● Tube Turns, Inc., Louisville, Ky.
Vilter Mfg. Co., Milwaukee, Wis.
U. S. Plug & Fitting Co., Cleveland, O.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
● Watson-Stillman Co., Roselle, N. J.
● Welding Fittings Corp., New Castle, Pa.

FLARED FITTINGS, COPPER TUBE

See Fittings, Copper, Tube, Flared

FLARED FITTINGS, STEEL TUBE

See Fittings, Steel Tube, Flared

FLARING TOOLS FOR TUBING

See Tools, Flaring

FLEXIBLE COUPLINGS

See Couplings, Flexible

FLEXIBLE DUCT CONNECTIONS

See Connections, Duct, Flexible

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FLEXIBLE METAL HOSE
See Hose, Metal and Fittings

FLOAT SWITCHES
See Switches, Float

FLOAT VALVES
See Valves, Float

FLOATS, STEAM TRAP, ETC.
● Armstrong Machine Wks., Three Rivers, Mich.
Bailey Co., Chas. M., San Francisco, Calif.
Chicago Float Works, Inc., Chicago, Ill.
● Crane Co., Chicago, Ill.
Cryer Trap & Valve Co., Inc., New York, N. Y.
Harris & Co., Arthur, Chicago, Ill.
Hercules Float Wks., Springfield, Mass.
● Hoffman Specialty Co., Indianapolis, Ind.
Kieley & Mueller, Inc., North Bergen, N. J.
McAlear Mfg. Co., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Naugatuck Mfg. Co., Union City, Conn.
● Nicholson & Co., W. H., Wilkes-Barre, Pa.
Reichert Float & Mfg. Co., Toledo, O.
Reliance Gauge Column Co., Cleveland, O.
Sterling Engineering & Mfg. Corp., Hyde Park, Mass.
● Swartwout Co., Cleveland, O.
● Trane Co., The, La Crosse, Wis.
Vapor Specialty Co., New York, N. Y.
Watson & McDaniel Co., Philadelphia, Pa.
Williams Gauge Co., The, Pittsburgh, Pa.

FLOOR AND CEILING PLATES
See Plates, Floor and Ceiling

FLOW CONTROL VALVES
See Valves, Flow Control

FLOW METERS
See Meters, Flow

FLOW SWITCHES
See Switches, Flow

FORGED STEEL VALVES
See Valves, Forged Steel

FRESHENERS, AIR
See Adsorbers, Odor; Compounds, Air Freshening

FUEL ECONOMIZERS
See Economizers, Fuel

FUEL OIL UNITS
See Units, Fuel Oil

FURNACES, DUCT
See Heaters, Duct

FURNACES, WARM AIR, FOR INDUSTRIAL AND LARGE BUILDING CENTRAL HEATING
(Exclusively for duct distribution of air—300,000 Btu per hr and over) For direct fired heaters, which may be located in the space heated or may be used in central plant installations with duct distribution of the air, see the listings under Heaters, Air, Direct Fired.

Aladdin Heating Corp., Oakland, Calif.
American Foundry & Furnace Co., Bloomington, Ill.
Arcweld Mfg. Co., Inc., Seattle, Wash.
Beck Engineering Combustion Kompany, St. Louis, Mo.
Campbell Heating Co., E. K., Kansas City, Mo.
● Campbell Heating Co., Des Moines, Ia.
Certified Furnace Co., Div. Stainless & Steel Products Co., St. Paul, Minn.
Hess Co., The, Chicago, Ill.
International Sales Co., San Francisco, Calif.
Jackson & Church Co., Saginaw, Mich.
● Lee Engineering Co., Hoboken, N. J.
Lennox Furnace Co., Columbus, O.
MaGirl Foundry & Furnace Co., Bloomington, Ill.
McPherson Furnace & Supply Co., Portland, Ore.
Meyer Furnace Co., The, Peoria, Ill.
● Mueller Furnace Co., L. J. Milwaukee, Wis.
National Heater Co., St. Paul, Minn.
Oilux Co., Fort Wayne, Ind.
Ray Oil Burner Co., San Francisco, Calif.
Rosebraugh Co., W. W., Salem, Ore.
● Surface Combustion Corp., Toledo, O.
● Syncromatic Corp., Watertown, Wis.

FUSIBLE LINKS
See Links, Fusible

GAGE GLASSES
See Glasses, Gage

GAGE TESTERS
See Testers, Gage, Dead Weight

GAGES, AIR FILTER
Defender Instrument and Regulator Co., St. Louis, Mo.
● Dollinger Corp., Rochester, N. Y.
Dwyer Mfg. Co., F. W., Chicago, Ill.
Ellison Draft Gage Co., Chicago, Ill.
● Hays Corp., Michigan City, Ind.
Herbusch Corp., The, St. Louis, Mo. (Warning device)
Hill, E. Vernon, Chicago, Ill.
Hotstream Heater Co., Cleveland, O.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Marshalltown Mfg. Co., Marshalltown, Ia.
Meriam Instrument Co., The, Cleveland, O.
● Research Products Corp., Madison, Wis.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.

GAGES, INDICATING, DRAFT
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Cleveland Fuel Equipment Co., Cleveland, O.
Cole-Sewell Engineering Co., St. Paul, Minn.
Defender Instrument and Regulator Co., St. Louis, Mo.
Dwyer Mfg. Co., F. W., Chicago, Ill.
Ellison Draft Gage Co., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
General Blower Co., Inc., Philadelphia, Pa.
● Hays Corp., Michigan City, Ind.
Hill, E. Vernon & Co., Chicago, Ill.
Hotstream Heater Co., Cleveland, O.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
● Illinois Testing Laboratories, Inc., Chicago, Ill.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Marshalltown Mfg. Co., Marshalltown, Ia.
Meriam Instrument Co., The, Cleveland, O.
Moeller Instrument Co., Richmond Hill, N. Y.
Perfex Corp., Milwaukee, Wis.
Precision Scientific Co., Chicago, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Republic Flow Meters Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.

GAGES, INDICATING, PRESSURE
Ashton Valve Co., Cambridge, Mass.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Belfield Valve Div. of Minneapolis-Honeywell, Philadelphia, Pa.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Clapp Instrument Co., Webster, Mass.
Cleveland Fuel Equipment Co., Cleveland, O.
Defender Instrument and Regulator Co., St. Louis, Mo.
● Dole Valve Co., The, Chicago, Ill.
Dwyer Mfg. Co., F. W., Chicago, Ill.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Foxboro Co., Foxboro, Mass.
Garden City Instruments, Inc., Chicago, Ill.
General Blower Co., Inc., Philadelphia, Pa.
Giannini & Co., Inc., G. M., Pasadena, Calif.
Gotham Instrument Co., Inc., New York, N. Y.
● Hays Corp., Michigan City, Ind.
Helicoid Gage Div., American Chain & Cable Co., Inc., Bridgeport, Conn.
● Hoffman Specialty Co., Indianapolis, Ind.
Hotstream Heater Co., Cleveland, O.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Keller Tool Co., Grand Haven, Mich.
Lonergan Co., J. E., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Marsh Corp., Jas. P., Skokie, Ill.
Marshalltown Mfg. Co., Marshalltown, Ia.
Meriam Instrument Co., The, Cleveland, O.
● Mettler Co., Lee B., Los Angeles, Calif.
Modern Engineering Co., St. Louis, Mo.
Mouat Vapor Heating Co., The, Cleveland, O.
Norgren Co., C. A., Denver, Colo.
Perfex Corp., Milwaukee, Wis.
Preferred Utilities Mfg. Corp., New York, N. Y.
Republic Flow Meters Co., Chicago, Ill.
Rochester Mfg. Co., Rochester, N. Y.

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Scientific Instrument Co., Detroit, Mich.
Stewart-Warner Corp., Heating Div., Indianapolis, Ind.
Tagliabue Corp., C. J., Newark, N. J.
● Taylor Instrument Companies, Rochester, N. Y.
● Thrush & Co., H. A., Peru, Ind.
● Trane Co., The, La Crosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Uehling Instrument Co., Paterson, N. J.
United States Gauge Div. of American Machine & Metals, Inc., Sellersville, Pa.
● Watson-Stillman Co., Roselle, N. J.
Weksler Thermometer Corp., New York, N. Y.

GAGES, INDICATING, VACUUM

Ashton Valve Co., Cambridge, Mass.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Belfield Valve Div. of Minneapolis-Honeywell, Philadelphia, Pa.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Clapp Instrument Co., Webster, Mass.
Defender Instrument and Regulator Co., St. Louis, Mo.
● Dole Valve Co., The, Chicago, Ill.
Dwyer Mfg. Co., F. W., Chicago, Ill.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Foxboro Co., Foxboro, Mass.
Giannini & Co., Inc., G. M., Pasadena, Calif.
Gotham Instrument Co., Inc., New York, N. Y.
● Hastings Instrument Co., Hampton, Va.
● Hays Corp., Michigan City, Ind.
Helicoid Gage Div., American Chain & Cable Co., Inc., Bridgeport, Conn.
Hill, E. Vernon & Co., Chicago, Ill.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Lonergan Co., J. E., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Marsh Corp., Jas. P., Skokie, Ill.
Marshalltown Mfg. Co., Marshalltown, Ia.
Meriam Instrument Co., The, Cleveland, O.
Mouat Vapor Heating Co., The, Cleveland, O.
Preferred Utilities Mfg. Corp., New York, N. Y.
Republic Flow Meters Co., Chicago, Ill.
Rochester Mfg. Co., Rochester, N. Y.
Scientific Instrument Co., Detroit, Mich.
Skaneateles Mfg. Co., Inc., Syracuse, N. Y.
Stewart-Warner Corp., Heating Div., Indianapolis, Ind.
Stokes Machine Co., F. J., Philadelphia, Pa.
Tagliabue Corp., C. J., Newark, N. J.
● Taylor Instrument Companies, Rochester, N. Y.
● Trane Co., The, La Crosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
United States Gauge Div. of American Machine & Metals, Inc., Sellersville, Pa.
Wallace & Tiernan, Inc., Newark, N. J.
Weksler Thermometer Corp., New York, N. Y.

GAGES, LIQUID LEVEL

Alloy Steel Products Co., Linden, N. J. (Stainless steel)
American Injector Co., Detroit, Mich.
Applied Mechanics Co., Boston, Mass.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Barton Instrument Co., Los Angeles, Calif.
Bearlee Products Co., Green Bay, Wis.
Belfield Valve Div. of Minneapolis-Honeywell, Philadelphia, Pa.
Boston Auto Gage Co., Pittsfield, Mass.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Caldwell Co., W. E., Louisville, Ky.
Defender Instrument and Regulator Co., St. Louis, Mo.
Detroit Brass & Malleable Works, Detroit, Mich.
Diamond Power Specialty Corp., Detroit, Mich.
Electric Auto-Lite Co., Toledo, O.
Ernst Water Column & Gage Co., Livingston, N. J.
Foxboro Co., Foxboro, Mass.
Giannini & Co., Inc., G. M., Pasadena, Calif.
● Hays Corp., Michigan City, Ind.
● Henry Valve Co., Melrose Park, Ill.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Keckley Co., O. C., Chicago, Ill.
King Engineering Corp., Ann Arbor, Mich.
Klingerite, Inc., New York, N. Y.
Krueger Sentry Gauge Co., Green Bay, Wis.
Liquidometer Corp., Long Island City, N. Y.
Lonergan Co., J. E., Philadelphia, Pa.
● Lunkenheimer Co., Cincinnati, O.
Marshalltown Mfg. Co., Marshalltown, Ia.
McAlear Mfg. Co., Chicago, Ill.
Mel-Gauge Co., East Haven, Conn.
Mel Products Co., The, New Haven, Conn.
Meriam Instrument Co., The, Cleveland, O.
● Mettler Co., Lee B., Los Angeles, Calif.
Moore Products Co., Philadelphia, Pa.
Morse-Smith-Morse, Inc., Watertown, Mass.
Nason Co., Detroit, Mich.
Newark Boiler Regulator Co., Inc., Bloomfield, N. J.
Oil Equipment Mfg. Corp., New Haven, Conn.
Penberthy Injector Co., Detroit, Mich.
Petrometer Corp., Long Island City, N. Y.
Powell Co., Wm., Cincinnati, O.
Reliance Gauge Column Co., Cleveland, O.
Republic Flow Meters Co., Chicago, Ill.
Rochester Mfg. Co., Rochester, N. Y.
Scientific Instrument Co., Detroit, Mich.
Stewart-Warner Corp., Heating Div., Indianapolis, Ind.
Swift Lubricator Co., Elmira, N. Y.
● Taylor Instrument Companies, Rochester, N. Y.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
United States Gauge Div. of American Machine & Metals, Inc., Sellersville, Pa.
Viking Pump Co., Cedar Falls, Ia.
Wallace & Tiernan Co., Newark, N. J.
Williams Gauge Co., The, Pittsburgh, Pa. (Water)
Wright-Austin Co., Detroit, Mich.
● Yarnall-Waring Co., Philadelphia, Pa.

GAGES, OIL TANK

Boston Auto Gage Co., Pittsfield, Mass.
Electric Auto-Lite Co., Toledo, O.
King Engineering Corp., Ann Arbor, Mich.
Krueger Sentry Gauge Co., Green Bay, Wis.
Liquidometer Corp., Long Island City, N. Y.
Penberthy Injector Co., Detroit, Mich.
Rochester Mfg. Co., Inc., Rochester, N. Y.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.

GALVANIZED SHEETS

See Sheets, Steel, Galvanized

GALVANNEALED SHEETS

See Sheets, Steel, Galvannealed

GAS BURNERS

See Burners, Gas

GAS ENGINES

See Engines, Gas

GAS FIRED RADIATORS

See Radiators, Gas Fired

GAS PRESSURE REGULATORS

See Regulators, Pressure, Gas

GAS VOLUME METERS

See Meters, Volume, Air and Gas

GASKETS

Acadia Synthetic Products Div., Western Felt Works, Chicago, Ill. (Felt, rubber)
Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Akron Metallic Gasket Co., Akron, O.
Alpha Metals, Inc., Brooklyn, N. Y.
American Felt Co., Glenville, Conn.
Anchor Packing Co., Philadelphia, Pa. (Asbestos)
● Armstrong Cork Co., Lancaster, Pa., (Cork & cork composition)
Austin-Mason Co., Everett, Mass.
Azor Corp., Irvington, N. J. (Spiral wound)
Baldwin Belting, Inc., New York, N. Y.
Belmont Packing & Rubber Co., Philadelphia, Pa.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y. (Lead)
Chase Brass & Copper Co., Waterbury, Conn. (Brass and copper)
Chicago-Wilcox Mfg. Co., Chicago, Ill.
Clow & Sons, James B., Chicago, Ill.
Continental-Diamond Fibre Co., Newark, Del.
Continental Rubber Wks., Erie, Pa.
● Crane Co., Chicago, Ill.
Darcoid Co., Inc., New York, N. Y. (Asbestos)
Durabla Mfg. Co., New York, N. Y. (Asbestos fibre)
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Endura Mfg. Corp., Quakertown, Pa. (Paper, fibre)
Excelsior Leather Washer Mfg. Co., Rockford, Ill.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Felt Products Mfg. Co., Chicago, Ill. (Heat and oil resisting)
Felters Company, The, Boston, Mass.
Flexitallic Gasket Co., Camden, N. J. (Metal, asbestos)
Flexlock Corp., Akron, O.
Garlock Packing Co., Palmyra, N. Y.
Gates Rubber Co., The, Denver, Colo.
Gatke Corp., Chicago, Ill.
General Electric Co., Chemical Dept., Pittsfield, Mass.

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Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Grant Wilson Inc., Chicago, Ill. (asbestos)
Graton & Knight Co., Worcester, Mass. (Leather)
Greene, Tweed & Co., North Wales, Pa.
Houghton & Co., E. F., Philadelphia, Pa. (Leather)
Johns-Manville, New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa. (Asbestos)
Klingerit, Inc., New York, N. Y.
Linear Incorporated, Philadelphia, Pa.
Metallo Gasket Co., New Brunswick, N. J. (Metal, metal asbestos)
Mortell Co., J. W., Kankakee, Ill.
National Engineering Products, Inc., Washington, D. C. (Plastic)
National Lead Co., New York, N. Y.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Products Research Co., Los Angeles, Calif.
Quaker Rubber Corp., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J. (Rubber and asbestos)
Resistoflex Corp., Belleville, N. J.
Rubatex Div., Great American Industries, Inc., Bedford, Va.
Schieren Co., Chas. A., New York, N. Y.
Smooth-On Mfg. Co., Jersey City, N. J. (Corrugated iron)
Sponge Rubber Products Co., Shelton, Conn.
Steel Improvement & Forge Co., Cleveland, O.
Stokes Molded Products, Inc., Trenton, N. J. (Hard rubber)
Technical Ply-Woods, Chicago, Ill.
Thermoid Co., Trenton, N. J.
Union Asbestos & Rubber Co., Cicero, Ill.
United States Gasket Co., Camden, N. J.
United States Rubber Co., New York, N. Y. (Rubber, asbestos)
United States Stoneware Co., New York, N. Y.
Western Felt Wks., Chicago, Ill. (Felt)
Zimmerman Packing Co., Cincinnati, O. (also gasket cutters)

GASOLINE FIRED HEATERS

See Heaters, Gasoline Fired

GATE VALVES

See Valves, Gate

GATES, BLAST

Allington & Curtis Mfg. Co., Saginaw, Mich.
Berger Bros., Co., Philadelphia, Pa.
● Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
● Clarage Fan Co., Kalamazoo, Mich.
Day Co., The, Minneapolis, Minn.
Goethel Sheet Metal Works, Alfred, Milwaukee, Wis.
Kirk & Blum Mfg. Co., Cincinnati, O.
Maysteel Products, Inc., Milwaukee, Wis.
Newcomb-Detroit Co., Detroit, Mich.
Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
Spencer Turbine Co., Hartford, Conn.
Thermix Corp., The, Greenwich, Conn.
Western Blower Co., Seattle, Wash.
Winkler & Sons, Inc., A. E., Milwaukee, Wis.

GLASS, HEAT ABSORBING

See Windows, Heat Insulating

GLASS PIPE

See Pipe, Glass

GLASSES, GAGE

Chicago Specialty Mfg. Co., Chicago, Ill.
Corning Glass Works, Corning, N. Y.
Daigger & Co., A., Chicago, Ill.
Defender Instrument & Regulator Co., St. Louis, Mo.
Detroit Brass & Malleable Works, Detroit, Mich.
Diamond Power Specialty Corp., Detroit, Mich.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
● Henry Valve Co., Melrose Park, Ill.
Klingerit, Inc., New York, N. Y.
Libbey-Owens-Ford Glass Co., Toledo, O.
● Lunkenheimer Co., Cincinnati, O.
Magnetrol, Inc., Chicago, Ill.
Swift Lubricator Co., Elmira, N. Y.

GLASSES, SIGHT, FOR PIPE LINES

● American District Steam Co., North Tonawanda, N. Y.
● Armstrong Machine Wks., Three Rivers, Mich.
Bowser, Inc., Fort Wayne, Ind.
Cochrane Corp., Philadelphia, Pa.
Corning Glass Works, Corning, N. Y.
Fischer & Porter Co., Hatboro, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Libbey-Owens-Ford Glass Co., Toledo, O.
Mueller Brass Co., Port Huron, Mich.
O P W Corp., Cincinnati, O.
Powell Co., Wm., The, Cincinnati, O.
Remco, Inc., Zelienople, Pa. (for refrigerant lines)
Schutte & Koerting Co., Philadelphia, Pa.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Swift Lubricator Co., Elmira, N. Y.
Weatherhead Co., Cleveland, O.

GLOBE VALVES

See Valves, Globe

GLYCOL VAPORIZERS

See Units, Sterilizing, Air

GOVERNORS, PUMP

Atlas Valve Co., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Boylston Steam Specialty Co., Chicago, Ill.
Burrows Mfg. Co., F. A., York, Pa.
● Cash Co., A. W., Decatur, Ill.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
● Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Hagan Corp., Pittsburgh, Pa.
Keckley Co., O. C., Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Valves, Inc., Div. of Hamilton-Thomas Corp., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Locke Regulator Co., Salem, Mass.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Northern Equipment Co., Erie, Pa.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
Sampsel Time Control, Inc., Spring Valley, Ill.
Schade Valve Mfg. Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
● Spence Engineering Co., Inc., Walden, N. Y.
Squires Co., C. E., Cleveland, O.
Staples & Pfeiffer, San Francisco, Calif.
● Swartwout Co., Cleveland, O.
Watson & McDaniel Co., Philadelphia, Pa.
● Webster & Co., Warren, Camden, N. J.
Williams Gauge Co., The, Pittsburgh, Pa.

GRILLES

See also Diffusers; Panels, Perforated, for Air Diffusion; Registers

A. & A. Register Co., Cleveland, O.
● A-J Mfg. Co., Kansas City, Mo.
Acme Mfg. Co., Holmesburg, Philadelphia, Pa.
Air Control Products, Inc., Coopersville, Mich.
● Alton Mfg. Co., Dallas, Tex.
American Foundry & Furnace Co., Bloomington, Ill.
American Warming & Ventilating Co., Toledo, O.
● Auer Register Co., Cleveland, O.
Bahnson Co., Winston-Salem, N. C.
Barber-Colman Co., Rockford, Ill.
Beckley Perforating Co., Garwood, N. J.
Best Register Co., Milwaukee, Wis.
Central Wire & Iron Works, Des Moines, Ia.
Char-Gale Mfg. Co., Minneapolis, Minn.
Controlair Mfg. Co., Los Angeles, Calif.
Crown Iron Works, Minneapolis, Minn.
Decatur Iron & Steel Co., Decatur, Ala.
Diamond Mfg. Co., Wyoming, Pa.
Eaglesfield Ventilator Co., Indianapolis, Ind. (wood)
Empire Ventilation Equipment Co., Long Island City, N. Y.
Erdle Perforating Co., Rochester, N. Y.
Harrington & King Perforating Co., Chicago, Ill.
Hart & Cooley Mfg. Co., Holland, Mich.
Hendrick Mfg. Co., Carbondale, Pa.
● Independent Register Co., Cleveland, O.
Jamieson Mfg. Co., Dallas, Tex.
Johnston & Chapman Co., Chicago, Ill.
Lockjoint Wood Products Co., Wichita, Kans. (Wood)
Manhattan Perforated Metal Co., Inc., Long Island City, N. Y.
Midco Register Corp., St. Paul, Minn.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Mundt & Sons, Charles, Jersey City, N. J.
● Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Reliable Perforating Co., Chicago, Ill.
Rock Island Register Co., Rock Island, Ill.
Schoedinger, F. O., Columbus, O.
Smith Co., J. B., Philadelphia, Pa.
● Standard Stamping & Perforating Co., Chicago, Ill.
Stewart Mfg. Co., Inc., Bloomfield, N. J.
● Titus Mfg. Corp., Waterloo, Iowa.
Turnbull Mfg. & Dist. Co., Detroit, Mich.
● Tuttle & Bailey, Inc., New Britain, Conn.
● United States Air Conditioning Corp., Minneapolis, Minn.
United States Register Co., Battle Creek, Mich.
Utility Appliance Corp., Los Angeles, Calif.
Viking Mfg. Corp., Cleveland, O.
Western Wire & Iron Works, Inc., Chicago, Ill. (metal)
Wickwire Spencer Steel, Div. of Colorado Fuel & Iron Corp., Buffalo, N. Y.
Young Regulator Co., Cleveland, O.

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GUNS AND POTS, SMOKE AND SMUDGE, FOR TESTING AIR MOVEMENT

- Hill, E. Vernon & Co., Chicago, Ill.
- ● Newman Co., Inc., I. C., New York, N. Y. (smoke containers)
- Pains Fireworks Display Co., New York, N. Y.
- Unexcelled Mfg. Co., Inc., New York, N. Y.

HAND SHEARS

See Shears and Snips, Hand

HANGERS OR BRACKETS, RADIATOR

- ● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
- Arjac Products, Inc., Rochester, N. Y.
- ● Bell & Gossett Co., Morton Grove, Ill.
- Carpenter & Paterson, Inc., East Boston, Mass.
- Carty & Moore Engineering Co., Detroit, Mich.
- ● Crane Co., Chicago, Ill.
- Crawford Co., Chicago, Ill.
- Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
- ● Grinnell Co., Inc., Providence, R. I.
- Hartmann Co., Chas., Brooklyn, N. Y.
- Healy Ruff Co., St. Paul, Minn.
- Jennison Co., Fitchburg, Mass. (Adjustable radiator foot rest)
- National Radiator Co., The, Johnstown, Pa.
- Power Piping Div., Blaw-Knox Co., Pittsburgh, Pa.
- ● Unistrut Products Co., Chicago, Ill.
- United States Radiator Corp., Detroit, Mich.
- Western Hanger Co., San Francisco, Calif.

HANGERS AND SUPPORTS, DUCT

- Acme Mfg. Co., Philadelphia, Pa.
- Hexdall Co., A. M., Morris, Ill.
- Moore Inc., Goodloe E., Danville, Ill.
- Powder Power Tool Corp., Portland, Ore.
- ● Stemco Corp., The, Rocky River, O.
- ● Unistrut Products Co., Chicago, Ill.

HANGERS AND SUPPORTS, PIPE

- ● American District Steam Co., North Tonawanda, N. Y.
- Atlantic Steel Co., Atlanta, Ga.
- Carpenter & Paterson, Inc., East Boston, Mass.
- Chase Brass & Copper Co., Waterbury, Conn.
- Crawford Co., Chicago, Ill.
- Farley Sleeve & Hanger Co., Cleveland, O.
- Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
- ● Frick Co., Waynesboro, Pa.
- G & H Mfg. Co., Philadelphia, Pa. (hook)
- General Fittings Co., Providence, R. I. (strap hangers)
- Genspring, Inc., New York, N. Y.
- Grabler Mfg. Co., Cleveland, O.
- ● Grinnell Co., Inc., Providence, R. I.
- Hupp Corp., Globe Stamping Div., Cleveland, O.
- Iwan Brothers, Inc., South Bend, Ind.
- Korfund Co., Inc., Long Island City, N. Y.
- ● Midwest Piping & Supply Co., Inc., St. Louis, Mo.
- Minerallac Electric Co., Chicago, Ill.
- Moore Inc., Goodloe E., Danville, Ill.
- National Valve & Mfg. Co., Pittsburgh, Pa.
- Paine Co., Chicago, Ill.
- Piping Specialties, Inc., New York, N. Y. (anchor and guide for expansion joints)
- Powder Power Tool Corp., Portland, Ore.
- Ravena Iron Co., Ravena, N. Y. (hook plates)
- Reintjes Co., Geo. P., Kansas City, Mo.
- ● Ric-wiL Co., Cleveland, O.
- ● Ritter Pattern & Casting Co., New York City, N. Y. (jack type adjustable tunnel stanchion)
- Rockwood Sprinkler Co., Worcester, Mass.
- Roessing Mfg. Co., Pittsburgh, Pa.
- Russell Mfg. Co., John M., Naugatuck, Conn.
- Truscon Steel Co., Youngstown, O.
- ● Unistrut Products Co., Chicago, Ill.
- Western Wire Products Co., St. Louis, Mo. (wire pipe hooks and perforated hanger iron)

HARD RUBBER PIPE AND FITTINGS

See Pipe, Hard Rubber; Fittings, Pipe, Hard Rubber

HEADERS, WELDED

- ● Acme Industries, Inc., Jackson, Mich.
- American Locomotive Co., Alco Products Div., New York, N. Y.
- Baker Refrigeration Corp., South Windham, Me.
- Ball Welding Works, Inc., Oakland, Calif.
- Chicago Nipple Mfg. Co., Cicero, Ill.
- Clow & Sons, James B., Chicago, Ill.
- Cobra Pipe & Coil Co., Inc., Elmwood, Conn.
- Columbian Steel Tank Co., Kansas City, Mo.
- ● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
- ● Crane Co., Chicago, Ill.
- Crotty Mfg. Corp., Long Island, N. Y.
- Downingtown Iron Works, Downingtown, Pa.
- ● Doyle & Roth Mfg. Co., Brooklyn, N. Y.
- Flori Pipe Co., The, St. Louis, Mo.
- Fluor Corp., Ltd., The, Los Angeles, Calif.
- ● Frick Co., Waynesboro, Pa.
- ● Grinnell Co., Inc., Providence, R. I.
- International Engineering Wks., Inc., Framingham, Mass.
- Kellogg Co., M. W., The, New York, N. Y.
- Lumsden & Van Stone Div. of Midwest Piping & Supply Co., South Boston, Mass.
- ● Midwest Piping & Supply Co., Inc., St. Louis, Mo.
- Mitchell & Co., Inc., W. K., Philadelphia, Pa.
- National Pipe Bending Co., New Haven, Conn.
- National Valve & Mfg. Co., Pittsburgh, Pa.
- Naylor Pipe Co., Chicago, Ill.
- Ohio Pipe Bending & Mach. Co., Cleveland, O.
- Patterson-Kelley Co., Inc., East Stroudsburg, Pa.
- Philadelphia Pipe Bending Co., Philadelphia, Pa.
- Pittsburgh Pipe Coil & Bending Co., Etna, Pa.
- Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
- Power Piping Div., Blaw-Knox Co., Pittsburgh, Pa.
- Reco Products Div., Refrigeration Engineering Corp., Philadelphia, Pa.
- ● Rempe Co., Chicago, Ill.
- Richmond Engineering Co., Inc., Richmond, Va.
- Roessing Mfg. Co., Pittsburgh, Pa.
- Sales & Co., Murray W., Detroit, Mich.
- Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
- Shaw Co., Benjamin F., Wilmington, Del.
- Shaw Kendall Engineering Co., Toledo, O.
- Vilter Mfg. Co., Milwaukee, Wis.
- Western Piping & Engineering Co., San Francisco, Calif.
- ● Whitlock Mfg. Co., Hartford, Conn.

HEADS, EXHAUST, FOR PIPE LINES

- Biggs Boiler Wks., Co., The, E. Akron, O.
- Cochrane Corp., Philadelphia, Pa.
- Dickinson, Aeolus, Chicago, Ill.
- Flori Pipe Co., The, St. Louis, Mo.
- Hoppes Mfg. Co., Inc., Springfield, O.
- ● Illinois Engineering Co., Chicago, Ill.
- Kieley & Mueller, Inc., North Bergen, N. J.
- Wright-Austin Co., Detroit, Mich.

HEADS, SPRINKLER, FOR FIRE PROTECTION

- Cleghorn Co., Boston, Mass.
- ● Grinnell Co., Inc., Providence, R. I.
- Hodgman Mfg. Co., Taunton, Mass.
- Raisler Corp., Grimes Sprinkler Div., New York, N. Y.
- Rockwood Sprinkler Co., Worcester, Mass.
- Ross Sprinkler Co., Pasadena, Calif.

HEAT EXCHANGERS

See Chillers, Water; Condensers, Refrigerating; Exchangers, Heat; Surface, Cooling; Surface, Heating

HEAT PUMPS

See Units, Air Conditioning, Reverse Refrigeration Cycle

HEATERS, AIR, DIRECT FIRED, COAL

For furnaces for central plant installation EXCLUSIVELY for duct distribution of the air, see the listing under Furnaces.

- Campbell Heating Co., E. K., Kansas City, Mo.
- ● Campbell Heating Co., Des Moines, Ia.
- Johnson Heater Corp., Saugas, Mass.
- ● Lee Engineering Co., Hoboken, N. J.
- National Heater Co., St. Paul, Minn.
- ● Olson & Co., Arthur A., Canfield, O.

HEATERS, AIR, DIRECT FIRED, GAS, CENTRIFUGAL FAN TYPE

- Acme Equipment Co., Muskogee, Okla.
- Airtherm Mfg. Co., St. Louis, Mo.
- American Furnace Co., St. Louis, Mo.
- Automatic Gas Equipment Co., Pittsburgh, Pa.
- Campbell Heating Co., E. K., Kansas City, Mo.
- ● Campbell Heating Co., Des Moines, Ia.
- Chicago Steel Furnace Co., Chicago, Ill.
- Dravo Corp., Pittsburgh, Pa.
- ● General Gas Light Co., Kalamazoo, Mich.
- Hastings Air Conditioning Co., Inc., Hastings, Neb.
- Johnson Heater Corp., Saugas, Mass.
- ● Lee Engineering Co., Hoboken, N. J.
- ● Mueller Furnace Co., L. J., Milwaukee, Wis.
- Nat Corp., Kansas City, Mo.
- National Heater Co., St. Paul, Minn.
- Newcomb-Detroit Co., Detroit, Mich.
- Norman Products Co., Inc., Columbus, O.
- ● Olson & Co., Arthur A., Canfield, O.
- ● Prat-Daniel Corp., East Port Chester, Conn.
- Reznor Mfg. Co., Mercer, Pa.
- ● Surface Combustion Corp., Toledo, O.
- ● United States Air Conditioning Corp., Minneapolis, Minn.
- Utility Appliance Corp., Los Angeles, Calif.
- ● Zink Co., John, Tulsa, Okla.

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HEATERS, AIR, DIRECT FIRED, OIL, FLOOR TYPE

Airtherm Mfg. Co., St. Louis, Mo.
Campbell Heating Co., E. K., Kansas City, Mo.
Chicago Steel Furnace Co., Chicago, Ill.
Dravo Corp., Pittsburgh, Pa.
Gilbert & Barker Mfg. Co., West Springfield, Mass.
Johnson Heater Corp., Saugas, Mass.
● Lee Engineering Co., Hoboken, N. J.
National Heater Co., St. Paul, Minn.
● Olson & Co., Arthur A., Canfield, O.
● Prat-Daniel Corp., East Port Chester, Conn.

HEATERS, AIR, DIRECT FIRED, OIL, SUSPENDED TYPE

Airtherm Mfg. Co., St. Louis, Mo.
American Furnace Co., St. Louis, Mo.
Campbell Heating Co., E. K., Kansas City, Mo.
Chicago Steel Furnace Co., Chicago, Ill.
Dravo Corp., Pittsburgh, Pa.
Gilbert & Barker Mfg. Co., West Springfield, Mass.
Jackson & Church Co., Saginaw, Mich.
● Lee Engineering Co., Hoboken, N. J.
National Heater Co., St. Paul, Minn.
● Olson & Co., Arthur A., Canfield, O.
Overhead Heaters, Inc., Detroit, Mich.
Williams Oil-O-Matic Div., Eureka Williams Corp., Bloomington, Ill.

HEATERS, CONVECTION

See Radiation, Convection Type

HEATERS, DUCT, ELECTRIC

Brown Fintube Co., The, Elyria, O.
Consolidated Car-Heating Co., Inc., Albany, N. Y.
Despatch Oven Co., Minneapolis, Minn.
Electromode Corp., Rochester, N. Y.
Falcon Equipment Co., New Brighton, Pa.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Industrial Engineering & Equipment Co., St. Louis, Mo.
Martin-Quaid Co., Philadelphia, Pa.
Tenney Engineering, Inc., Newark, N. J.
Trent Inc., Philadelphia, Pa.
● Wiegand Co., Edwin L., Pittsburgh, Pa.

HEATERS, DUCT, GAS

Allan Engineering Co., Dallas, Tex.
Bryant Heater Div., Affiliated Gas Equipment Co., Inc., Cleveland, O.
● General Gas Light Co., Kalamazoo, Mich.
Great National Air Conditioning Corp., Oklahoma City, Okla.
● **Hayes Furnace & Mfg. Co., Inc., Los Angeles, Calif.**
International Sales Co., San Francisco, Calif.
Kehm Corp., The, Chicago, Ill.
Meyer Furnace Co., The, Peoria, Ill.
Naco Mfg. Co., Huntington Park, Calif.
Norman Products Co., Inc., Columbus, O.
Palmer Mfg. Corp., Phoenix, Ariz.
Payne Furnace Div., Affiliated Gas Equipment, Inc., Monrovia, Calif.
Reznor Mfg. Co., Mercer, Pa.
Royal Heaters, Inc., Alhambra, Calif.
St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
● **Surface Combustion Corp., Toledo, O.**
Utility Appliance Corp., Los Angeles, Calif.

HEATERS, FEEDWATER

See Deaerators

HEATERS, GASOLINE FIRED (FOR AIRCRAFT AND PORTABLE GROUND USE)

Fluid Heat Div., Anchor Post Products Inc., Baltimore, Md.
Stewart-Warner Corp., Heating Div., Indianapolis, Ind.
● **Surface Combustion Corp., Toledo, O.**

HEATERS, INDIRECT, SUBMERGED

● American District Steam Co., North Tonawanda, N. Y.
● **Bell & Gossett Co., Morton Grove, Ill.**
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Brown Fintube Co., Elyria, O.
● Davis Engineering Corp., Elizabeth, N. J.
● Doyle & Roth Mfg. Co., Brooklyn, N. Y.
General Fittings Co., Providence, R. I.
Gerstein & Cooper Co., Inc., South Boston, Mass.
Graham Mfg. Co., Inc., New York, N. Y.
Richmond Engineering Co., Inc., Richmond, Va.
Sims Co., Erie, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
● Superior Combustion Industries, Inc., Emmaus, Pa.
Taco Heaters, Inc., Providence, R. I.
Western Blower Co., Seattle, Wash.
Yula Water Heaters, Inc., New York, N. Y.

HEATERS, STEAM JET, FOR LIQUIDS

● **Condenser Service & Engineering Co., Inc., Hoboken, N. J.**
● Duriron Co., Inc., The, Dayton, O.
Penberthy Injector Co., Detroit, Mich.
Schutte & Koerting Co., Philadelphia, Pa.
Sims Co., Erie, Pa.

HEATERS, STRIP AND IMMERSION, ELECTRIC

American Instrument Co., Silver Spring, Md.
Consolidated Car-Heating Co., Inc., Albany, N. Y.
Cooper Co., Clark, Palmyra, N. J.
Cutler-Hammer, Inc., Milwaukee, Wis.
Falcon Equipment Co., New Brighton, Pa.
Fluid Systems, Inc., New Haven, Conn.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
H. & A. Co., Buffalo, N. Y.
Industrial Engineering & Equipment Co., St. Louis, Mo.
Red Spot Electric Co., Tacoma, Wash.
Trent Inc., Philadelphia, Pa.
Vulcan Electric Co., Danvers, Mass.
● Westinghouse Electric Corp., Pittsburgh, Pa.
● Wiegand Co., Edwin L., Pittsburgh, Pa.

HEATERS, UNIT, ELECTRIC HEATING ELEMENT

American Thermal Industries, Inc., Detroit, Mich.
Electromode Corp., Rochester, N. Y.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Heating Assurance, Inc., Spokane, Wash.
Lintern Co., Berea, O.
Martin-Quaid Co., Philadelphia, Pa.
Meco, Inc., Portland, Ore.
Red Spot Electric Co., Tacoma, Wash.
Royal Heaters, Inc., Alhambra, Calif.
Trent Inc., Philadelphia, Pa.
Vulcan Electric Co., Danvers, Mass.
● Westinghouse Electric Corp., Pittsburgh, Pa.
● **Wiegand Co., Edwin L., Pittsburgh, Pa.**

HEATERS, UNIT, GAS, PROPELLER FAN TYPE

Allan Engineering Co., Dallas, Tex.
Automatic Gas Equipment Co., Pittsburgh, Pa.
Barwick Mfg. Corp., Wichita, Kan.
Bryant Heater Div., Affiliated Gas Equipment Co., Inc., Cleveland, O.
Campbell Heating Co., E. K., Kansas City, Mo.
● Carrier Corp., Syracuse, N. Y.
Central States Mfg. Co., Inc., Arkansas City, Kan.
Clow & Sons, James B., Chicago, Ill.
● General Gas Light Co., Kalamazoo, Mich.
Hastings Air Conditioning Corp., Hastings, Neb.
Ilg Electric Ventilating Co., Chicago, Ill.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Lennox Furnace Co., The, Marshalltown, Ia.
● Mueller Furnace Co., L. J., Milwaukee, Wis.
Nat Corp., Kansas City, Mo.
National Radiator Co., The, Johnstown, Pa.
Norman Products Co., Inc., Columbus, O.
Palmer Mfg. Corp., Phoenix, Ariz.
Reznor Mfg. Co., Mercer, Pa.
● Surface Combustion Corp., Toledo, O.
United Electric Service Co., Wichita Falls, Tex.
● United States Air Conditioning Corp., Minneapolis, Minn.
Utility Appliance Corp., Los Angeles, Calif.
● Wing Mfg. Co., L. J., New York, N. Y.
● **Zink Co., John, Tulsa, Okla.**

HEATERS, UNIT, STEAM AND HOT WATER, CABINET TYPE

Airtherm Mfg. Co., St. Louis, Mo.
● **American Blower Corp., Detroit, Mich.**
American Thermal Industries, Inc., Detroit, Mich.
Brown Products Co., Forest Hills, N. Y.
● **Buffalo Forge Co., Buffalo, N. Y.**
Chicago Fan & Fin Coil Co., Chicago, Ill.
● **Dunham Co., G. A., Chicago, Ill.**
Hastings Air Conditioning Co., Inc., Hastings, Neb.
● **McCord Corp., Detroit, Mich.**
McQuay, Inc., Minneapolis, Minn.
● **Modine Mfg. Co., Racine, Wis.**
● **Nelson Corp., Herman, Moline, Ill.**
● **Trane Co., The, La Crosse, Wis.**
● **United States Air Conditioning Corp., Minneapolis, Minn.**
● **Webster & Co., Warren, Camden, N. J.**
Western Blower Co., Seattle, Wash.
● **Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.**
● **Young Radiator Corp., Racine, Wis.**

HEATERS, UNIT, STEAM AND HOT WATER, CENTRIFUGAL FAN TYPE

Airtherm Mfg. Co., St. Louis, Mo.
● **American Blower Corp., Detroit, Mich.**
American Thermal Industries, Inc., Detroit, Mich.
● **Bishop & Babcock Mfg. Co., Cleveland, O.**

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Brown Products Co., Forest Hills, N. Y.
● Buffalo Forge Co., Buffalo, N. Y.
● Carrier Corp., Syracuse, N. Y.
● Clarage Fan Co., Kalamazoo, Mich.
Chicago Fan & Fin Coil Co., Chicago, Ill.
● Dunham Co., C. A., Chicago, Ill.
Hastings Air Conditioning Co., Inc., Hastings, Neb.
Heating Assurance, Inc., Spokane, Wash.
Industrial Mfg. & Engineering Co., Chicago, Ill.
● McCord Corp., Detroit, Mich.
McQuay, Inc., Minneapolis, Minn.
● Nelson Corp., Herman, Moline, Ill.
● Nesbitt, Inc., John J., Philadelphia, Pa.
● New York Blower Co., Chicago, Ill.
St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Temp-Control, Inc., Peoria, Ill.
● Trane Co., The, La Crosse, Wis.
● United States Air Conditioning Corp., Minneapolis, Minn.
● Webster & Co., Warren, Camden, N. J.
Western Blower Co., Seattle, Wash.
● Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Wilson Engineering Corp., Chicago, Ill.
Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
● Young Radiator Co., Racine, Wis.

HEATERS, UNIT, STEAM AND HOT WATER, PROPELLER FAN TYPE, HORIZONTAL BLOW

Airtherm Mfg. Co., St. Louis, Mo.
● American Blower Corp., Detroit, Mich.
Beacon-Morris Corp., Boston, Mass.
Bern's Mfg. Co., Chicago, Ill.
● Bishop & Babcock Mfg. Co., Cleveland, O.
Brown Products Co., Forest Hills, N. Y.
● Buffalo Forge Co., Buffalo, N. Y.
Campbell Heating Co., E. K., Kansas City, Mo.
● Carrier Corp., Syracuse, N. Y.
Chicago Fan & Fin Coil Co., Chicago, Ill.
● Clarage Fan Co., Kalamazoo, Mich.
● Dunham Co., C. A., Chicago, Ill.
● Fedders-Quigan Corp., Buffalo, N. Y.
● Grinnell Co., Inc., Providence, R. I.
Hartzell Propeller Fan Co., Piqua, O.
Ilg Electric Ventilating Co., Chicago, Ill.
Industrial Mfg. & Engineering Co., Chicago, Ill.
● King Co., The, Owatonna, Minn.
Kisco Boiler & Engineering Co., St. Louis, Mo.
● McCord Corp., Detroit, Mich.
McQuay, Inc., Minneapolis, Minn.
Merchant & Evans Co., Philadelphia, Pa.
● Modine Mfg. Co., Racine, Wis.
Muckle Mfg. Co., Owatonna, Minn.
● Murray Mfg. Co., D. J., Wausau, Wis.
National Radiator Co., The, Johnstown, Pa.
● Nelson Corp., Herman, Moline, Ill.
● Nesbitt, Inc., John J., Philadelphia, Pa.
● New York Blower Co., Chicago, Ill.
● Rittling Corp., The, Buffalo, N. Y.
St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Tenney Engineering, Inc., Newark, N. J.
● Trane Co., The, La Crosse, Wis.
● United States Air Conditioning Corp., Minneapolis, Minn.
United States Radiator Corp., Detroit, Mich.
● Webster & Co., Warren, Camden, N. J.
Western Blower Co., Seattle, Wash.
● Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Wilson Engineering Corp., Chicago, Ill.
● Wing Mfg. Co., L. J., New York, N. Y.
● Young Radiator Co., Racine, Wis.

HEATERS, UNIT, STEAM AND HOT WATER, PROPELLER FAN TYPE, VERTICAL BLOW

Airtherm Mfg. Co., St. Louis, Mo.
● American Blower Corp., Detroit, Mich.
Beacon-Morris Corp., Boston, Mass.
● Bishop & Babcock Mfg. Co., Cleveland, O.
● Buffalo Forge Co., Buffalo, N. Y.
● Carrier Corp., Syracuse, N. Y.
Chicago Fan & Fin Coil Co., Chicago, Ill.
● Clarage Fan Co., Kalamazoo, Mich.
● Dunham Co., C. A., Chicago, Ill.
● Fedders-Quigan Corp., Buffalo, N. Y.
● Grinnell Co., Inc., Providence, R. I.
● McCord Corp., Detroit, Mich.
McQuay, Inc., Minneapolis, Minn.
● Modine Mfg. Co., Racine, Wis.
● Murray Mfg. Co., D. J., Wausau, Wis.
National Radiator Co., The, Johnstown, Pa.
● Nelson Corp., Herman, Moline, Ill.
● Nesbitt, Inc., John J., Philadelphia, Pa.
● New York Blower Co., Chicago, Ill.
● Rittling Corp., The, Buffalo, N. Y.
● Trane Co., The, La Crosse, Wis.
● United States Air Conditioning Corp., Minneapolis, Minn.
United States Radiator Corp., Detroit, Mich.
Western Blower Co., Seattle, Wash.
● Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
● Wing Mfg. Co., L. J., New York, N. Y.
● Young Radiator Co., Racine, Wis.

HEATERS, VENTILATION

See Surface, Finned, Heating; Ventilators, Roof, Fan; Ventilators, Unit

HEATERS, WATER, CAST IRON, COAL FIRED

Adams Co., The, Dubuque, Ia.
● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Burnham Corp., Boiler Div., Irvington, N. Y.
Cleghorn Co., Boston, Mass.
Eastern Foundry Co., Peerless Heater Div., Boyertown, Pa.
International Heater Co., Utica, N. Y.
Prox Co., Inc., Frank, Terre Haute, Ind.
Smith Co., Inc., H. B., The, Westfield, Mass.
● Spencer Heater Div., Avco Mfg. Corp., Williamsport, Pa.
Stokol Stoker Co., Inc., Dayton, O.
United States Radiator Corp., Detroit, Mich.
Weil-McLain Co., Michigan City, Ind.

HEATERS, WATER, ELECTRIC

Auburn Burner Co., Auburn, Ind.
Bastian-Morley Co., Inc., LaPorte, Ind.
Bogue Electric Co., Paterson, N. J.
Brown Fintube Co., The, Elyria, O.
Clayton & Lambert Mfg. Co., Louisville, Ky.
Cutler-Hammer, Inc., Milwaukee, Wis.
Frigidaire Div., General Motors Corp., Dayton, O.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Hotpoint Inc., Chicago, Ill.
Hotstream Heater Co., Cleveland, O.
Industrial Engineering & Equipment Co., St. Louis, Mo.
Livingstone Engineering Co., Worcester, Mass.
Martin-Quaid Co., Philadelphia, Pa.
Oilux Co., Fort Wayne, Ind.
Red Spot Electric Co., Tacoma, Wash.
Rheem Mfg. Co., New York, N. Y.
Smith Corp., A. O., Milwaukee, Wis.
Trent Inc., Philadelphia, Pa.
Viking Mfg. Corp., Cleveland, O.
● Westinghouse Electric Corp., Pittsburgh, Pa.
● Wiegand Co., Edwin L., Pittsburgh, Pa.
Wood Mfg. Co., Inc., John, Conshohocken, Pa.

HEATERS, WATER, GAS FIRED

● Aldrich Co., The, Wyoming, Ill.
● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Auburn Burner Co., Auburn, Ind.
Bastian-Morley Co., Inc., LaPorte, Ind.
Birchfield Boiler, Inc., Tacoma, Wash.
Brown Fintube Co., The, Elyria, O.
Brown Products Co., Forest Hills, N. Y.
Bryant Corp., C. L., Cleveland, O.
Bryant Heater Div., Affiliated Gas Equipment Co., Inc., Cleveland, O.
Clayton & Lambert Mfg. Co., Louisville, Ky.
● Cleaver-Brooks Co., Milwaukee, Wis.
Day & Night Div., Affiliated Gas Equipment, Inc., Monrovia, Calif.
Delco Appliance Div., General Motors Corp., Rochester, N. Y.
Dewey-Shepard Boiler Co., Indianapolis, Ind.
Duo-Therm Div., Motor Wheel Corp., Lansing, Mich.
Dutton Co., C. H., Kalamazoo, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
● Gold Top Heating, Inc., Butte, Mont.
Heat Equipment not Inc., Chicago, Ill.
Hook & Ackerman, Inc., New York, N. Y.
Hotstream Heater Co., Cleveland, O.
Kehm Corp., The, Chicago, Ill.
Mission Appliance Corp., Los Angeles, Calif.
Montgomery Bros., San Francisco, Calif.
● Mueller Furnace Co., L. J., Milwaukee, Wis.
Oilux Co., Fort Wayne, Ind.
Pacific Steel Boiler Div., United States Radiator Corp., Detroit, Mich.
Pittsburgh Water Heater Corp., Pittsburgh, Pa.
Rheem Mfg. Co., New York, N. Y.
Richmond Radiator Co., New York, N. Y.
Rotary Mfg. Co., Los Angeles, Calif.
Ruud Mfg. Co., Pittsburgh, Pa.
Schoedinger, F. O., Columbus, O.
● Sellers Engineering Co., Chicago, Ill.
Smith Co., Inc., H. B., The, Westfield, Mass.
Smith Corp., A. O., Milwaukee, Wis.
Stout & Sons, David, St. Louis, Mo.
Swett & Co., George E., San Francisco, Calif.
United States Radiator Corp., Detroit, Mich.
Viking Mfg. Corp., Cleveland, O.
Wood Mfg. Co., John, Conshohocken, Pa.

HEATERS, WATER, INDIRECT

Akwa Heaters, Inc., New York, N. Y.
● American District Steam Co., North Tonawanda, N. Y.
● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
● Bell & Gossett Co., Morton Grove, Ill.

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- Birchfield Boiler, Inc., Tacoma, Wash.
- Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
- Bryant Heater Div., Affiliated Gas Equipment Co., Inc., Cleveland, O.
- ● Davis Engineering Corp., Elizabeth, N. J.
- ● Doyle & Roth Mfg. Co., Brooklyn, N. Y.
- Ferguson & Lange Foundry Co., Chicago, Ill.
- General Fittings Co., Providence, R. I.
- Graham Mfg. Co., Inc., New York, N. Y.
- Hook & Ackerman, Inc., New York, N. Y.
- Hotstream Heater Co., Cleveland, O.
- Howard Iron Works & Alberger Heater Div., Buffalo, N. Y.
- Kehm Corp., The, Chicago, Ill.
- Lewis & Co., Joseph E., Baltimore, Md.
- National Radiator Co., The, Johnstown, Pa.
- ● Sellers Engineering Co., Chicago, Ill.
- Sims Co., Erie, Pa.
- Standard Heater & Oil Equipment Co., Jersey City, N. J.
- Taco Heaters, Inc., Providence, R. I.
- ● Thrush & Co., H. A., Peru, Ind.
- Triplex Heating Specialty Co., Inc., Peru, Ind.
- Western Blower Co., Seattle, Wash.
- ● Whitlock Mfg. Co., Hartford, Conn.
- Yula Water Heaters, Inc., New York, N. Y.

HEATERS, WATER, INDIRECT, COMBINATION TANK AND TANKLESS

- ● Bell & Gossett Co., Morton Grove, Ill.
- Bethlehem Foundry & Machine Co., Bethlehem, Pa.
- Birchfield Boiler, Inc., Tacoma, Wash.
- Blackburn-Smith Mfg. Co., Hoboken, N. J.
- Burnham Corp., Boiler Div., Irvington, N. Y.
- ● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
- Crotty Mfg. Corp., Long Island, N. Y.
- ● Davis Engineering Corp., Elizabeth, N. J.
- ● Doyle & Roth Mfg. Co., Brooklyn, N. Y.
- General Fittings Co., Providence, R. I.
- Heat Equipment not Inc., Chicago, Ill.
- Hook & Ackerman, Inc., New York, N. Y.
- Hotstream Heater Co., Cleveland, O.
- Howard Iron Works & Alberger Heater Div., Buffalo, N. Y.
- Penberthy Injector Co., Detroit, Mich.
- Richmond Engineering Co., Inc., Richmond, Va.
- Sims Co., Erie, Pa.
- Standard Heater & Oil Equipment Co., Jersey City, N. J.
- ● Taco Heaters, Inc., Providence, R. I.
- Triplex Heating Specialty Co., Inc., Peru, Ind.
- Western Blower Co., Seattle, Wash.
- ● Whitlock Mfg. Co., Hartford, Conn.
- Yula Water Heaters, Inc., New York, N. Y.

HEATERS, WATER, OIL FIRED

- Aeroil Products Co., Inc., South Hackensack, N. J. (Portable)
- ● Air Devices, Inc., New York, N. Y.
- Airtemp, Div. of Chrysler Corp., Dayton, O.
- ● Aldrich Co., The, Wyoming, Ill.
- Auburn Burner Co., Auburn, Ind.
- Bastian-Morley Co., Inc., LaPorte, Ind.
- Birchfield Boiler, Inc., Tacoma, Wash.
- Brown Fintube Co., The, Elyria, O.
- Brown Products Co., Forest Hills, N. Y.
- Century Engineering Corp., Cedar Rapids, Ia.
- Clayton & Lambert Mfg. Co., Louisville, Ky.
- ● Cleaver-Brooks Co., Milwaukee, Wis.
- Conco Engineering Works, Div. of H. D. Conkey & Co., Mendota, Ill.
- Delco Appliance Div., General Motors Corp., Rochester, N. Y,
- Dewey-Shepard Boiler Co., Indianapolis, Ind.
- Duo-Therm Div., Motor Wheel Corp., Lansing, Mich.
- Dutton Co., C. H., Kalamazoo, Mich.
- Electrol Burner Mfg. Co., Inc., Rutherford, N. J.
- ● Fitzgibbons Boiler Co., Inc., New York, N. Y.
- ● General Oil Burner Corp., Baltimore, Md.
- ● Gold Top Heating, Inc., Butte, Mont.
- Hanson-Gates Mfg. Co., Inc., Reading, Mass.
- Heat Equipment not Inc., Chicago, Ill.
- Hotstream Heater Co., Cleveland, O.
- Johnson Co., S. T., Philadelphia, Pa.
- Nu-way Corp., The, Rock Island, Ill.
- Oilux Co., Fort Wayne, Ind.
- Pacific Steel Boiler Div., United States Radiator Corp., Detroit, Mich.
- Petroleum Heat & Power Co., Stamford, Conn.
- Preferred Utilities Mfg. Corp., New York, N. Y.
- Ray Oil Burner Co., San Francisco, Calif.
- Reif-Rexoil, Inc., Buffalo, N. Y.
- Rheem Mfg. Co., New York, N. Y.
- Scott-Newcomb, Inc., St. Louis, Mo.
- Smith Co., Inc., H. B., The, Westfield, Mass.
- ● Spencer Heater Div., Avco Mfg. Corp., Williamsport, Pa.
- Stokol Stoker Co., Inc., Dayton, O.
- United States Radiator Corp., Detroit, Mich.
- Vapor Heating Corp., Chicago, Ill.
- Viking Mfg. Corp., Cleveland, O.
- York Electric and Machine Co., York, Pa.
- York-Shipley, Inc., York, Pa.

HEATERS, WATER, STEAM, INSTANTANEOUS

- Akwa Heaters, Inc., New York, N. Y.
- ● American District Steam Co., North Tonawanda, N. Y.
- American Locomotive Co., Alco Products Div., New York, N. Y.
- ● Bell & Gossett Co., Morton Grove, Ill.
- Blackburn-Smith Mfg. Co., Hoboken, N. J.
- ● Brownell Co., The, Dayton, O.
- Coe Mfg. Co., Painesville, O.
- Croll-Reynolds Engineering Co., Inc., New York, N. Y.
- ● Davis Engineering Corp., Elizabeth, N. J.
- Downingtown Iron Works, Downington, Pa.
- ● Doyle & Roth Mfg. Co., Brooklyn, N. Y.
- Duffy Engrg. Co., Portland, Ore.
- Eclipse Fuel Engineering Co., Rockford, Ill.
- ● Fitzgibbons Boiler Co., Inc., New York, N. Y.
- General Fittings Co., Providence, R. I.
- Gerstein & Cooper Co., Inc., South Boston, Mass.
- Graham Mfg. Co., Inc., New York, N. Y.
- Hasco Valve & Machine Co., Milwaukee, Wis.
- Heat Transfer Products, Inc., Carbondale, Pa.
- Howard Iron Wks. & Alberger Heater Div., Buffalo, N. Y.
- International Engineering Wks., Inc., Framingham, Mass.
- Johnson Corp., The, Three Rivers, Mich.
- Keckley Co., O. C., Chicago, Ill.
- Koven & Bro., Inc., L. O., Jersey City, N. J.
- Lewis & Co., Joseph E., Baltimore, Md.
- Marion Machine Foundry & Supply Co., Marion, Ind.
- Montgomery Bros., San Francisco, Calif.
- National Pipe Bending Co., New Haven, Conn.
- O'Brien Steam Specialty Co., Inc., Syracuse, N. Y.
- Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
- Pick Mfg. Co., West Bend, Wis. (direct steam injection)
- Quaker City Iron Works, Philadelphia, Pa.
- Richmond Engineering Co., Inc., Richmond, Va.
- Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
- Schutte & Koerting Co., Philadelphia, Pa.
- Sims Co., Erie, Pa.
- Standard Heater & Oil Equipment Co., Jersey City, N. J.
- ● Swartwout Co., Cleveland, O.
- ● Whitlock Mfg. Co., Hartford, Conn.
- Yula Water Heaters, Inc., New York, N. Y.

HEATERS, WATER, STEAM, STORAGE

- Akwa Heaters, Inc., New York, N. Y.
- Alert Engineering Products, Detroit, Mich.
- ● American District Steam Co., North Tonawanda, N. Y.
- ● Bell & Gossett Co., Morton Grove, Ill.
- Birchfield Boiler, Inc., Tacoma, Wash.
- Blackburn-Smith Mfg. Co., Hoboken, N. J.
- Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
- ● Brownell Co., The, Dayton, O.
- Burnham Corp., Boiler Div., Irvington, N. Y.
- ● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
- Dahlquist Mfg. Co., Inc., Div. of Process Engineering Inc., Somerville, Mass.
- ● Davis Engineering Corp., Elizabeth, N. J.
- Downingtown Iron Works, Downington, Pa.
- ● Fitzgibbons Boiler Co., Inc., New York, N. Y.
- General Fittings Co., Providence, R. I.
- Gerstein & Cooper Co., Inc., South Boston, Mass.
- Heat Transfer Products, Inc., Carbondale, Pa.
- Hoppes Mfg. Co., Inc., Springfield, O.
- Howard Iron Wks. & Alberger Heater Div., Buffalo, N. Y.
- Johnson Corp., The, Three Rivers, Mich.
- Keckley Co., O. C., Chicago, Ill.
- ● Kewanee Boiler Corp., Kewanee, Ill.
- Koven & Bro., Inc., L. O., Jersey City, N. J.
- Manitowoc Engineering Wks., Manitowoc Wis.
- Marion Machine Foundry & Supply Co., Marion, Ind.
- National Pipe Bending Co., New Haven, Conn.
- Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
- Penberthy Injector Co., Detroit, Mich.
- Quaker City Iron Works, Philadelphia, Pa.
- Richmond Engineering Co., Inc., Richmond, Va.
- Rotary Mfg. Co., Los Angeles, Calif.
- Sims Co., Erie, Pa.
- Standard Heater & Oil Equipment Co., Jersey City, N. J.
- Stout & Sons, David, St. Louis, Mo.
- ● Swartwout Co., Cleveland, O.
- Vogt Machine Co., Henry, Louisville, Ky.
- Waterfilm Boilers, Inc., Jersey City, N. J.
- Western Blower Co., Seattle, Wash.
- ● Whitlock Mfg. Co., Hartford, Conn.
- Yula Water Heaters Inc., New York, N. Y.

HEATERS, WATER, STEEL, COAL FIRED

- Aeroil Products Co., Inc., South Hackensack, N. J. (Portable)
- Birchfield Boiler, Inc., Tacoma, Wash.
- Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
- Catskill Metal Works, Inc., Catskill, N. Y.
- Dutton Co., C. H., Kalamazoo, Mich.
- ● Fitzgibbons Boiler Co., Inc., New York, N. Y.
- Heat Equipment not Inc., Chicago, Ill.
- International Engineering Wks., Inc., Framingham, Mass.
- Johnston Bros., Inc., Ferrysburg, Mich.
- ● Kewanee Boiler Corp., Kewanee, Ill.
- Lookout Boiler & Mfg. Co., Chattanooga, Tenn.
- Pacific Steel Boiler Div., United States Radiator Corp., Detroit, Mich.
- ● Spencer Heater Div., Avco Mfg. Corp., Williamsport, Pa.
- Terre Haute Boiler Works, Co., Terre Haute, Ind.

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HEATING BOILERS

See Boilers, Heating

HEATING COILS

See Surface, Heating

HEATING SURFACE

See Surface, Heating

HOSE CLAMPS

See Clamps, Hose

HOSE, METAL, AND FITTINGS

Aeroquip Corp., Jackson, Mich.
American Metal Hose Branch, The American Brass Co., Waterbury, Conn.
Atlantic Metal Hose Co., Inc., New York, N. Y.
● Bendix Aviation Corp., Eclipse—Pioneer Div., Teterboro, N. J.
Brockway Co., Naugatuck, Conn.
Chicago Metal Hose Corp., Maywood, Ill.
Everhot Products Co., Chicago, Ill.
Gil-Lair Products, Inc., Pasadena, Calif.
Packless Metal Products Corp., New Rochelle, N. Y.
Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.
Seamlex Co., Inc., Long Island City, N. Y.
Techniflex Corp., Port Jerris, N. Y.
Titeflex, Inc., Newark, N. J.
United Metal Hose Co., Inc., Long Island City, N. Y.
● Zallea Brothers, Wilmington, Del.

HOSE, NON-METAL, AND FITTINGS

Aeroquip Corp., Jackson, Mich.
American Ventilating Hose Co., New York, N. Y.
Arrowhead Rubber Co., Los Angeles, Calif.
Boston Woven Hose & Rubber Co., Cambridge, Mass.
Continental Rubber Works, Erie, Pa.
DeVilbiss Co., The, Toledo, O.
Flexible Tubing Corp., Branford, Conn.
Gates Rubber Co., The, Denver, Colo.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Hamilton Rubber Mfg. Corp., Trenton, N. J.
● Henry Valve Co., Melrose Park, Ill.
Independent Pneumatic Tool Co., Aurora, Ill.
Raybestos-Manhattan, Inc., Passaic, N. J.
Republic Rubber Div., Lee Rubber and Tire Corp., Youngstown, O.
Resistoflex Corp., Belleville, N. J.
Roylyn, Inc., Glendale, Calif.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Thermoid Co., Trenton, N. J.
United States Rubber Co., New York, N. Y.

HOSE, VENTILATING

See Ducts and Duct Fittings, Prefabricated, Non-Metallic

HOT GAS DEFROSTING

See Systems, Hot Gas Defrosting for Refrigeration

HOT WATER HEATING SYSTEMS

See Systems, Heating, Hot Water

HOT WATER HEATING SYSTEMS, BALANCING ELBOWS FOR

See Elbows, Balancing, for Hot Water Heating System

HOT WATER PRESSURE REGULATORS

See Regulators, Pressure, Hot Water Heating Systems

HOUSINGS, FAN, CENTRIFUGAL

(Housing only—not complete fans)

● Bishop & Babcock Mfg. Co., Cleveland, O.
Bronson Mfg. Co., Los Angeles, Calif.
● Brundage Co., The, Kalamazoo, Mich.
Cincinnati Metalcrafts Inc., Cincinnati, O.
● Clarage Fan Co., Kalamazoo, Mich.
Commercial Shearing & Stamping Co., Youngstown, O.
Detroit Stamping Co., Detroit, Mich.
Gates Engineering Co., Wilmington, Del.
Hastings Air Conditioning Co., Hastings, Neb.
Haveg Corp., Newark, Del. (plastic for corrosive fumes)
Lau Blower Co., Dayton, O.
Martin Fan & Blower Co., Chicago, Ill.
Maysteel Products, Inc., Milwaukee, Wis.
Northern Blower Co., Cleveland, O.
Schwitzer-Cummins Co., Indianapolis, Ind.
● United States Air Conditioning Corp., Minneapolis, Minn.
Utica Products, Inc., Utica, N. Y.
Viking Air Conditioning Corp., Cleveland, O.

HOUSINGS, FAN, PROPELLER

(Housings only—not complete fans)

Acme Equipment Co., Muskogee, Okla.
Allen Ventilator Div., Production Planning Co., Rochester, Mich.
Cincinnati Metalcrafts Inc., Cincinnati, O.
Circulators & Devices Mfg. Corp., New York, N. Y.
Commercial Shearing & Stamping Co., Youngstown, O.
● De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Gates Engineering Co., Wilmington, Del.
Haveg Corp., Newark, Del. (plastic for corrosive fumes)
Schwitzer-Cummins Co., Indianapolis, Ind.

HUMIDIFIERS, CENTRAL PLANT

● Air & Refrigeration Corp., New York, N. Y.
● American Blower Corp., Detroit, Mich.
American Foundry & Furnace Co., Bloomington, Ill.
● Armstrong Machine Wks., Three Rivers, Mich.
Bahnson Co., Winston-Salem, N. C.
Barber-Colman Co., Rockford, Ill.
● Carrier Corp., Syracuse, N. Y.
● Clarage Fan Co., Kalamazoo, Mich.
Cleveland Humidifier Co., Cleveland, O.
● Farr Co., Los Angeles, Calif.
● Johnson Service Co., Milwaukee, Wis.
● McDonnell & Miller, Inc., Chicago, Ill.
Mellish & Murray Co., Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
National Air Conditioning Inc., Johnstown, Pa.
National Engineering & Mfg. Co., Kansas City, Mo.
● Niagara Blower Co., New York, N. Y.
Parks-Cramer Co., Fitchburg, Mass.
● Powers Regulator Co., Chicago, Ill.
Skuttle Mfg. Co., Detroit, Mich.
Steamaire Co., Cincinnati, O.
● Surface Combustion Corp., Toledo, O.
● Trane Co., The, LaCrosse, Wis.
Viking Air Conditioning Corp., Cleveland, O.
Vilter Mfg. Co., Milwaukee, Wis.
● York Corp., York, Pa.

HUMIDIFIERS, DIRECT, SPRAY HEAD

American Moistening Co., Providence, R. I.
Anetsberger Bros., Inc., Northbrook, Ill.
● Armstrong Machine Works, Three Rivers, Mich.
Bahnson Co., Winston-Salem, N. C. (Centrifugal).
Binks Mfg. Co., Chicago, Ill.
Blower Application Co., Milwaukee, Wis.
● Buffalo Forge Co., Buffalo, N. Y.
Drying Systems, Inc., Chicago, Ill.
● Grinnell Co., Inc., Providence, R. I.
International Moistening Co., Providence, R. I.
● Maid-O'Mist, Inc., Chicago, Ill.
Manufacturers Machine Co., North Andover, Mass.
● Marley Co., Inc., The, Kansas City, Kans.
● Marlo Coil Co., St. Louis, Mo.
● Murray Mfg. Co., D. J., Wausau, Wis.
● New York Blower Co., Chicago, Ill.
Paasche Airbrush Co., Chicago, Ill.
Parks-Cramer Co., Fitchburg, Mass.
Pfening Co., Fred D., Columbus, O.
Rhode Island Humidifier & Ventilator Co., Boston, Mass.
Ross Sprinkler Co., Pasadena, Calif.
Somers, Inc., H. J., Detroit, Mich.
Spray Engineering Co., Somerville, Mass.
● Spraying Systems Co., Bellwood, Ill.
Steamaire Co., Cincinnati, O.
Supreme Electric Products Corp., Rochester, N. Y.
● Trane Co., The, LaCrosse, Wis.
Water Cooling Corp., New York, N. Y.

HUMIDIFIERS FOR RADIATORS AND CONVECTORS

Kauffman Air Conditioning Corp., St. Louis, Mo.
● Maid-O'-Mist, Inc., Chicago, Ill.
Skilbeck Mfg. Co., Kenosha, Wis.
Techtmann Industries, Inc., Milwaukee, Wis.

HUMIDIFIERS, RADIATOR VENT VALVE

G & H Mfg. Co., Philadelphia, Pa.
● Maid-O'-Mist, Inc., Chicago, Ill.
Skilbeck Mfg. Co., Kenosha, Wis.

HUMIDIFIERS, UNIT, ROOM TYPE (Without Heating)

● Armstrong Machine Wks., Three Rivers, Mich.
● Carrier Corp., Syracuse, N. Y.
Fresh'nd-Aire Co., Div. of Cory Corp., Chicago, Ill.
Health Trola Div., Excel Heating & Air Conditioning Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Little Giant Vaporizer Co., Inc., Oklahoma City, Okla.
● Murray Mfg. Co., D. J., Wausau, Wis.
National Engineering & Mfg. Co., Kansas City, Mo.

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Palmer Mfg. Corp., Phoenix, Ariz.
Somers, Inc., H. J., Detroit, Mich.
● Spraying Systems Co., Bellwood, Ill.
Standard Engineering Wks., Pawtucket, R. I.
Steamaire Co., Cincinnati, O.
● United States Air Conditioning Corp., Minneapolis, Minn.
Walton Laboratories, Inc., Irvington, N. J.
Water Cooling Corp., New York, N. Y.

HUMIDIFYING RADIATORS

See Radiators, Humidifying

HUMIDISTATS

American Instrument Co., Silver Spring, Md.
American Moistening Co., Providence, R. I.
● Autempco Corp., New York, N. Y.
Bahnson Co., Winston-Salem, N. C.
Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
● General Controls Co., Glendale, Calif.
H-B Instrument Co., Philadelphia, Pa.
● Johnson Service Co., Milwaukee, Wis.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Parks-Cramer Co., Fitchburg, Mass.
Penn Electric Switch Co., Goshen, Ind.
● Powers Regulator Co., Chicago, Ill.
Standard Engineering Wks., Pawtucket, R. I.
Tagliabue Corp., C. J., Newark, N. J.
● Taylor Instrument Companies, Rochester, N. Y.
Walton Laboratories, Inc., Irvington, N. J.
● White-Rodgers Electric Co., St. Louis, Mo.

HUMIDITY INDICATORS

See Indicator-Controllers, Relative Humidity; Psychrometers

HUMIDITY RECORDERS

See Recorders, Humidity

HUMIDITY AND TEMPERATURE CONTROLS

See Humidistats; Recorder-Controllers; Thermostats

HYDRAULIC PIPE PUSHERS

See Pushers, Pipe, Hydraulic

HYDRAULIC SPEED CHANGERS

See Changers, Speed, Hydraulic Coupling

HYGROMETERS

American Instrument Co., Silver Spring, Md.
American Moistening Co., Providence, R. I.
Bristol Co., The, Waterbury, Conn.
Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Daigger & Co., A., Chicago, Ill.
Fee and Stemwedel, Inc., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
G. M. Mfg. Co., New York, N. Y.
Garden City Instruments, Inc., Chicago, Ill.
General Scientific Equipment Co., Philadelphia, Pa.
Gotham Instrument Co., Inc., New York, N. Y.
H-B Instrument Co., Philadelphia, Pa.
Hill, E. Vernon & Co., Chicago, Ill.
● Illinois Testing Laboratories, Inc., Chicago, Ill.
International Moistening Co., Providence, R. I.
● Johnson Service Co., Milwaukee, Wis.
Moeller Instrument Co., Richmond Hill, N. Y.
Palmer Thermometers, Inc., Cincinnati (Norwood), O.
Scientific Instrument Co., Detroit, Mich.
Standard Thermometer, Inc., Boston, Mass.
Tagliabue Corp., C. J., Newark, N. J.
● Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Wallace & Tiernan Co., Inc., Newark, N. J.
Weksler Thermometer Corp., New York, N. Y.
Will Corp., Rochester, N. Y.

HYGROSTATS

See Humidistats

IDENTIFICATION MARKERS (For Piping Services)

Brady Co., W. H., Milwaukee, Wis.
Western Lithograph Co., Los Angeles, Calif.

IMMERSION THERMOSTATS

See Thermostats, Immersion

INDICATING THERMOMETERS

See Thermometers, Indicating

INDICATOR-CONTROLLERS, PRESSURE

Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Cook Electric Co., Diaphlex Div., Chicago, Ill.
Cooper Co., Clark., Palmyra, N. J.
Electro Products Laboratories, Inc., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
Giannini & Co., Inc., G. M., Pasadena, Calif.
Gotham Instrument Co., Inc., New York, N. Y.
● Hays Corp., Michigan City, Ind.
● Illinois Engineering Co., Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
Mason-Neilan Regulator Co., Boston, Mass.
Moore Products Co., Philadelphia, Pa.
Penn Industrial Instrument Corp., Philadelphia, Pa.
● Powers Regulator Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Shallcross Controls, Inc., Milwaukee, Wis.
Tagliabue Corp., C. J., Newark, N. J.
● Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
United States Gauge, Div. of American Machine & Metals, Inc., Sellersville, Pa.

INDICATOR-CONTROLLERS, RELATIVE HUMIDITY

American Instrument Co., Silver Spring, Md.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Gotham Instrument Co., Inc., New York, N. Y.
● Johnson Service Co., Milwaukee, Wis.
Leeds & Northrup Co., Philadelphia, Pa.
● Powers Regulator Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Corp., C. J., Newark, N. J.
● Taylor Instrument Companies, Rochester, N. Y.

INDICATOR-CONTROLLERS, TEMPERATURE

American Instrument Co., Silver Spring, Md.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Foxboro Co., Foxboro, Mass.
Gotham Instrument Co., Inc., New York, N. Y.
● Illinois Engineering Co., Chicago, Ill.
● Illinois Testing Laboratories, Inc., Chicago, Ill.
● Johnson Service Co., Milwaukee, Wis.
Leeds & Northrup Co., Philadelphia, Pa.
Mason-Neilan Regulator Co., Boston, Mass.
Moore Products Co., Philadelphia, Pa.
Penn Industrial Instrument Corp., Philadelphia, Pa.
● Powers Regulator Co., Chicago, Ill.
Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.
● Sarco Co., Inc., New York, N. Y.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Corp., C. J., Newark, N. J.
● Taylor Instrument Companies, Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
United States Gauge, Div. of American Machine & Metals, Inc., Sellersville, Pa.
Wheelco Instruments Co., Chicago, Ill.
● Wiegand Co., Edwin L., Pittsburgh, Pa.

INDICATORS, CARBON DIOXIDE, BOILER ROOM

For Portable CO_2 Analyzers, See Analyzers, Carbon Dioxide, Portable

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Davis Emergency Equipment Co., Newark, N. J.
Defender Instrument and Regulator Co., St. Louis, Mo.
Engelhard, Inc., Chas., Newark, N. J.
Ess Instrument Co., Bergenfield, N. J.
● Hays Corp., Michigan City, Ind.
Leeds & Northrup Co., Philadelphia, Pa.
Permutit Co., New York, N. Y.
Republic Flow Meters Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.

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INDICATORS, DEW POINT

Foxboro Co., Foxboro, Mass.
● Illinois Testing Laboratories, Inc., Chicago, Ill.
Pittsburgh Lectrodryer Corp., Pittsburgh, Pa.

INDICATORS, FLOW

See Meters, Flow

INDICATORS, LIQUID LEVEL, BOILER AND TANK

Automatic Control Co., St. Paul, Minn.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Barton Instrument Co., Los Angeles, Calif.
Boston Auto Gage Co., Pittsfield, Mass.
Bristol Co., The, Waterbury, Conn.
Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Cochrane Corp., Philadelphia, Pa.
Cook Electric Co., Diaphlex Div., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Defender Instrument & Regulator Co., St. Louis, Mo.
Detroit Brass & Malleable Works, Detroit, Mich.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
● Hays Corp., Michigan City, Ind.
Healy Ruff Co., St. Paul, Minn.
● Henry Valve Co., Melrose Park, Ill.
Magnetrol, Inc., Chicago, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
● McDonnell & Miller, Inc., Chicago, Ill.
Meriam Instrument Co., The, Cleveland, O.
Moore Products Co., Philadelphia, Pa.
Newark Boiler Regulator Co., Inc., Bloomfield, N. J.
Northern Equipment Co., Erie, Pa.
Petrometer Corp., Long Island City, N. Y.
Reliance Gauge Column Co., Cleveland, O.
Rochester Mfg. Co., Inc., Rochester, N. Y.
● Stephens-Adamson Mfg. Co., Aurora, Ill.
Swift Lubricator Co., Elmira, N. Y.
● Taylor Instrument Companies, Rochester, N. Y.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
United States Gauge Div. of American Machine & Metals, Inc., Sellersville, Pa.
Wallace & Tiernan Co., Inc., Newark, N. J.
● Yarnall-Waring Co., Philadelphia, Pa.

INDICATORS, RELATIVE HUMIDITY

Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Walton Laboratories, Inc., Irvington, N. J.

INDICATORS, SOUND LEVEL

General Electric Co., Apparatus Dept., Schenectady, N. Y.

INDIRECT HEATING SURFACE

See Surface, Heating

INDIRECT WATER HEATERS

See Heaters, Water, Indirect

INDUSTRIAL AIR CONDITIONERS

See Units, Air Conditioning, Industrial Type

INDUSTRIAL DRYERS

See Dryers, Industrial

INJECTOR RECIRCULATORS FOR REFRIGERANTS

Phillips & Co., H. A., Chicago, Ill.

INSTANTANEOUS WATER HEATERS

See Heaters, Water, Steam, Instantaneous

INSULATING CONCRETE

See Concrete, Insulating

INSULATION, BOILER AND TANK

Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Alfol Insulation Co., Inc., New York, N. Y. (Aluminum foil)
Alton Mineral Wool Insulation Co., St. Louis, Mo.
● Armstrong Cork Co., Lancaster, Pa. (85% Magnesia)
Badham Insulation Co., Inc., Birmingham, Ala.
Baldwin-Hill Co., Trenton, N. J. (Rock wool)
Barrett Div., The, Allied Chemical & Dye Corp., New York, N. Y.
Bird-Archer Co., Philadelphia, Pa.
Botfield Refractories Co., Philadelphia, Pa.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
● Cork Import Corp., Englewood, N. J. (Corkboard)
Eagle-Picher Co., Cincinnati, O.
Ehret Magnesia Mfg. Co., Valley Forge, Pa. (Magnesia)
Forty-Eight Insulations, Inc., Aurora, Ill.
Grant Wilson Inc., Chicago, Ill.
Green Fire Brick Co., Mexico, Mo.
International Vermiculite Co., Girard, Ill.
Johns-Manville, New York, N. Y.
Keasbey Co., Robert A., New York, N. Y. (Asbestos)
Keasbey & Mattison Co., Ambler, Pa.
Krehbiel Co., J. H., Chicago, Ill.
Laclede-Christy Co., St. Louis, Mo.
Lockport Batting Co., Lockport, N. Y.
Monsanto Chemical Co., Merimac Div., Boston, Mass.
● Mundet Cork Corp., North Bergen, N. J. (Cork)
Munn and Steel, Inc., Newark, N. J.
National Gypsum Co., Buffalo, N. Y. (Rock wool)
Norristown Magnesia & Asbestos Co., Norristown, Pa. (Asbestos and magnesia)
● Owens-Corning Fiberglas Corp., Toledo, O. (Blanket and board)
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Paraffine Companies, Inc., The, Insulation Div., San Francisco, Calif.
● Pittsburgh Corning Corp., Pittsburgh, Pa.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Plibrico Jointless Firebrick Co., Chicago, Ill.
Poe Co., C. W., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Refractory & Insulation Corp., New York, N. Y. (Blanket, block, cement)
Robinson Industries, Coleman, Mich. (expanded plastic)
Rock Fleece Co., El Paso, Tex.
Ruberoid Co., New York, N. Y. (Asbestos, magnesia)
● Sall Mountain Co., Chicago, Ill.
Schundler & Co., Inc., F. E., Long Island City, N. Y.
Smith & Kanzler Corp., Linden, N. J.
Standard Asbestos Mfg. Co., Chicago, Ill.
Standard Fuel Engineering Co., Detroit, Mich.
Telsit Insulation Co., Bronx, N. Y.
Union Asbestos & Rubber Co., Cicero, Ill.
United Cork Co., Kearny, N. J. (Cork)
United States Mineral Wool Co., South Milwaukee, Wis.
Walker Jamar Co., Duluth, Minn.
Western Mineral Products Co., Minneapolis, Minn.
● Zonolite Co., Chicago, Ill (plastic)

INSULATION, BUILDING

Acme Asbestos Covering & Flooring Co., Chicago, Ill. (Rock wool)
Air-O-Cel Co., Detroit, Mich.
Alfol Insulation Co., Inc., New York, N. Y., (Aluminum foil)
Alton Mineral Wool Insulation Co St. Louis, Mo.
American Flange & Mfg. Co., Inc., New York, N. Y. (Metal sheets)
American Hair & Felt Co., Chicago, Ill. (Hair felt)
● Armstrong Cork Co., Lancaster, Pa. (Corkboard, fibre board)
Bache & Co., Semon, New York N. Y. (Glass wool)
Badham Insulation Co., Inc., Birmingham, Ala.
Baldwin-Hill Co., Trenton, N. J (Rock wool)
Barrett Div., The, Allied Chemical & Dye Corp., New York, N. Y.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O. (Rock wool)
Carney Co., Inc., The, Mankato, Minn.
Celotex Corp., The, Chicago, Ill.
Certain-teed Products Corp., Ardmore, Pa.
Chamberlin Co. of America, Detroit, Mich.
● Cork Import Corp., Englewood, N. J. (Corkboard, mineral wool board)
Cork Insulation Co., Inc., New York, N. Y. (Corkboard)
Dry-Zero Corp., Chicago, Ill.
Eagle-Picher Co., Cincinnati, O. (Mineral wool, blankets, batts, granulated, loose)
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Fir-Tex Insulating Board Co., St. Helens, Ore. (Wood fibre-board)
Flintkote Co., The, New York, N. Y. (Glass wool)
General Insulating Products Co., Brooklyn, N. Y. (Rock wool)
Grant Wilson Inc., Chicago, Ill.
Gustin Bacon Mfg. Co., Kansas City, Mo.
Hogan & Co., Inc., C. T., New York, N. Y. (reflective)
● Infra Insulation, Inc., New York, N. Y. (reflective)
Insulite Div. Minnesota and Ontario Paper Co., Minneapolis, Minn. (Wood fibre)
Insul-Wool Insulation Corp., Wichita, Kans.
International Vermiculite Co., Girard, Ill. (Loose fill)
Johns-Manville, New York, N. Y. (Rock wool and wood fibre-board)
Johnston Foil Mfg. Co., St. Louis, Mo. (Foil, aluminum, tin, lead)
Kimberly-Clark Corp., Neenah, Wis.
Lockport Cotton Batting Co., Lockport, N. Y.
Masonite Corp., Chicago, Ill. (Blanket)
Mineral Insulation Co., Chicago Ridge, Ill. (Rock wool)
Multi-Cell Sales Corp., Minneapolis, Minn. (Blanket, quilted newspaper)
● Mundet Cork Corp., North Bergen, N. J. (Cork)
Munn & Steel, Inc., Newark, N. J.
National Gypsum Co., Buffalo, N. Y.
Nelson Mfg. Co., B. F., Minneapolis, Minn.
● Owens-Corning Fiberglas Corp., Toledo, O.
Pacific Lumber Co., The, San Francisco, Calif.
● Pittsburgh Corning Corp., Pittsburgh, Pa.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.

● Advertisement in this issue. See Index to Advertisers, page 120d

Plastergon Wall Board Co., Buffalo, N. Y. (Rigid board)
Poe Co., C. W., Cleveland, O.
Refractory & Insulation Corp., New York, N. Y. (Rock, slag wool)
Reynolds Metals Co., Louisville, Ky.
Rock Fleece Co., El Paso, Tex.
Rubatex Div., Great American Industries, Inc., Bedford, Va.
Russell Co., F. C., The, Cleveland, O.
Silvercote Products, Inc., Chicago, Ill.
Sprayo-Flake Co., Chicago, Ill.
Standard Asbestos Mfg. Co., Chicago, Ill. (Asbestos, hairfelt)
Standard Lime & Stone Co., Baltimore, Md.
Stic-Klip Mfg. Co., Cambridge, Mass. (Insulation fasteners)
Tennessee Products and Chemical Corp., Nashville, Tenn.
Truscon Steel Co., Youngstown, O. (Insulation board sealed between metal sheets)
United Cork Companies, Kearny, N. J. (Cork)
United States Gypsum Co., Chicago, Ill. (Wool and board)
United States Mineral Wool Co., South Milwaukee, Wis. (Mineral wool)
Universal Gypsum & Lime Co., Chicago, Ill. (Loose fill)
Western Mineral Products Co., Minneapolis, Minn.
● Wilson & Co., Inc., Chicago, Ill. (Board)
Wood Conversion Co., St. Paul, Minn.
● Zonolite Co., Chicago, Ill. (Loose fill)

INSULATION, DUCT, SOUND DEADENING

For Application Inside Duct

Baldwin-Hill Co., Trenton, N. J.
Celotex Corp., The, Chicago, Ill.
Dry-Zero Corp., Chicago, Ill.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Felters Company, The, Boston, Mass.
Grant Wilson, Inc., Chicago, Ill.
Insulite Div. Minnesota and Ontario Paper Co., Minneapolis, Minn.
Johns-Manville, New York, N. Y.
Keasbey Co., Robert A., New York, N. Y.
Kimberly-Clark Corp., Neenah, Wis.
Lockport Cotton Batting Co., Lockport, N. Y.
Mortell Co., J. W., Kankakee, Ill.
● Owens-Corning Fiberglas Corp., Toledo, O.
Stic-Klip Mfg. Co., Cambridge, Mass. (Insulation fasteners)
Telsit Insulation Co., Bronx, N. Y.
Thompson & Co., Oakmont, Pa.
United States Rubber Co., New York, N. Y.
Western Felt Works, Chicago, Ill.
● Zonolite Co., Chicago, Ill.

INSULATION, DUCT, THERMAL

Acme Asbestos Covering & Flooring Co., Chicago, Ill. (Asbestos)
Air-O-Cel Co., Detroit, Mich.
Alfol Insulation Co., Inc., New York, N. Y. (Aluminum foil)
American Flange & Mfg. Co., Inc., New York, N. Y.
American Hair & Felt Co., Chicago, Ill. (Hair felt)
● Armstrong Cork Co., Lancaster, Pa. (Corkboard)
Arrowhead Rubber Co., Los Angeles, Calif.
Baldwin-Hill Co., Trenton, N. J.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O. (Asbestos)
Celotex Corp., The, Chicago, Ill.
● Cork Import Corp., Englewood, N. J. (Corkboard, mineral wool board)
Cork Insulation Co., Inc., New York, N. Y. (Cork board)
Dry-Zero Corp., Chicago, Ill.
Eagle-Picher Co., Cincinnati, O. (Mineral wool blankets)
Ehret Magnesia Mfg. Co., Valley Forge, Pa. (Cork, magnesia, hair felt)
Felters Company, The, Boston, Mass. (Wool felt)
Fir-Tex Insulating Board Co., St. Helens, Ore. (Wood fibreboard)
General Insulating Products Co., Brooklyn, N. Y. (Acoustic rock wool)
Grant Wilson Inc., Chicago, Ill.
Hinde & Dauch Paper Co., Sandusky, O.
● Infra Insulation, Inc., New York, N. Y.
Insulite Div. Minnesota and Ontario Paper Co., Minneapolis, Minn. (Wood fibre)
International Vermiculite Co., Girard, Ill. (Block)
Johns-Manville, New York, N. Y. (Rock cork, asbestos)
Keasbey Co., Robert A., New York, N. Y. (Asbestos and cork)
Keasbey & Mattison Co., Ambler, Pa. (Asbestos)
Keystone Asphalt Products Co., Chicago, Ill.
Kimberly-Clark Corp., Neenah, Wis.
Lockport Cotton Batting Co., Lockport, N. Y.
Masonite Corp., Chicago, Ill.
Mineral Insulation Co., Chicago Ridge, Ill. (Rock wool)
Mortell Co., J. W., Kankakee, Ill.
● Mundet Cork Corp., North Bergen, N. J. (Cork)
Munn and Steele, Inc., Newark, N. J.
Norristown Magnesia & Asbestos Co., Norristown, Pa. (Asbestos and wool felt)
● Owens-Corning Fiberglas Corp., Toledo, O. (Blanket)
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Paraffine Companies, Inc., The, Insulation Div., San Francisco, Calif.
● Pittsburgh Corning Corp., Pittsburgh, Pa.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Poe Co., C. W., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Refractory & Insulation Corp., New York, N. Y. (Block, blanket)
Reynolds Metals Co., Louisville, Ky.
Rock Fleece Co., El Paso, Tex.
Rubatex Div., Great American Industries, Inc., Bedford, Va.
Ruberoid Co., New York, N. Y. (Asbestos cellular and laminated sheets or blocks)
● Sall Mountain Co., Chicago, Ill. (Asbestos)
Schundler & Co., Inc., F. E., Long Island City, N. Y.
Smith & Kanzler Corp., Linden, N. J. (Asbestos air cell type)
Sprayo-Flake Co., Chicago, Ill.
Standard Asbestos Mfg. Co., Chicago, Ill. (Asbestos, hair felt)
Stic-Klip Mfg. Co., Cambridge, Mass. (Insulation fasteners)
Telsit Insulation Co., Bronx, N. Y.
Union Asbestos & Rubber Co., Cicero, Ill.
United Cork Companies, Kearny, N. J. (Cork)
United States Mineral Wool Co., South Milwaukee, Wis.
Western Felt Wks., Chicago, Ill. (Felt)
● Wilson & Co., Inc., Chicago, Ill.
Wood Conversion Co., St. Paul, Minn.
● Zonolite Co., Chicago, Ill. (plastic)

INSULATION FASTENERS

See Fasteners, Insulation

INSULATION, PIPE

Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Alfol Insulation Co., Inc., New York, N. Y. (Aluminum foil)
● American District Steam Co., North Tonawanda, N. Y. (Underground)
American Hair & Felt Co., Chicago, Ill.
● Armstrong Cork Co., Lancaster, Pa. (Cork)
Badham Insulation Co., Inc., Birmingham, Ala.
Baldwin-Hill Co., Trenton, N. J. (Rock wool)
Barrett Div., The, Allied Chemical & Dye Corp., New York, N. Y.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O. (Asbestos, magnesia)
● Cork Import Corp., Englewood, N. J. (Corkboard)
Cork Insulation Co., New York, N. Y.
● Durant Insulated Pipe Co., Palo Alto, Calif. (Underground)
Eagle-Picher Co., Cincinnati, O. (Mineral wool)
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Forty-Eight Insulations, Inc., Aurora, Ill.
Grant Wilson Inc., Chicago, Ill.
International Vermiculite Co., Girard, Ill. (Vermiculite)
Johns-Manville, New York, N. Y. (Asbestos, magnesia, rock cork)
Keasbey Co., Robert A., New York, N. Y. (Asbestos and cork)
Keasbey & Mattison Co., Ambler, Pa. (Asbestos, magnesia)
Lexington Supply Co., The, Cleveland, O. (waterproof protective fabric)
Masonite Corp., Chicago, Ill.
Mortell Co., J. W., Kankakee, Ill. (plastic cork)
● Mundet Cork Corp., North Bergen, N. J. (Cork)
Munn and Steele, Inc., Newark, N. J.
Mystik Adhesive Products Div., Chicago Show Printing Co., Chicago, Ill.
National Gypsum Co., Buffalo, N. Y. (Moulded)
Norristown Magnesia & Asbestos Co., Norristown, Pa. (Asbestos, magnesia)
● Owens-Corning Fiberglas Corp., Toledo, O.
Pacific States Felt Mfg. Co., Inc., San Francisco, Calif.
Paraffine Companies, Inc., Insulation Div., San Francisco, Calif.
Pittsburgh Corning Corp., Pittsburgh, Pa.
● Pittsburgh Corning Corp., Pittsburgh, Pa.
Poe Co., C. W., Cleveland, O.
● Porter & Co., Inc., H. W., Newark, N. J. (Underground)
Presstite Engineering Co., St. Louis, Mo.
● Ric-wiL Co., Cleveland, O.
Robinson Industries, Coleman, Mich. (expanded plastic)
Rock Fleece Co., El Paso, Tex.
Ruberoid Co., New York, N. Y. (Asbestos, magnesia, calsilite)
● Sall Mountain Co., Chicago, Ill. (Asbestos and wool felt)
Schundler & Co., Inc., F. E., Long Island City, N. Y.
Smith & Kanzler Corp., Linden, N. J. (Asbestos air cell, wool felt and hair felt)
Sponge Rubber Products Co., Shelton, Conn. (cellular rubber)
Standard Asbestos Mfg. Co., Chicago, Ill.
Union Asbestos & Rubber Co., Cicero, Ill.
United Cork Companies, Kearny, N. J.
Walker Jamar Co., Duluth, Minn.
Western Mineral Products Co., Minneapolis, Minn. (Underground)
● Wilson & Co., Inc., Chicago, Ill. (hairfelt)
● Zonolite Co., Chicago, Ill.

IONIZATION APPARATUS

Coroaire Heater Corp., The, Cleveland, O.
General Ozone Corp., Chicago, Ill.
Montgomery Bros., San Francisco, Calif.
United States Ozone Co. of America, Scottdale, Pa.
Welsbach Corp., The, Ozone Processes Div., Philadelphia, Pa.

IRON BODY VALVES

See Valves, Gate; and Valves, Globe

JACKETED PIPE

See Pipe, Jacketed

JETS, OVERFIRE AIR, FOR SMOKE ABATEMENT

Eclipse Fuel Engineering Co., Rockford, Ill.
Plibrico Jointless Firebrick Co., Chicago, Ill.

JOINTS, PIPE, ELECTRICAL INSULATING

American Hard Rubber Co., New York, N. Y.
Barco Mfg. Co., not Inc., Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.

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JOINTS, PIPE, EXPANSION, PACKLESS

● American District Steam Co., North Tonawanda, N. Y.
Badger Fire Extinguisher Co., Somerville, Mass.
● Badger Mfg. Co., Cambridge, Mass. (Corrugated copper, stainless steel)
Barco Mfg. Co., not Inc., Chicago, Ill.
Chicago Metal Hose Corp., Maywood, Ill.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
● Foster Wheeler Corp., New York, N. Y.
● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Harris & Co., Arthur, Chicago, Ill.
Kopperman & Sons, Joseph, Philadelphia, Pa.
MagniLastic Div., Cook Electric Co., Chicago, Ill.
National Valve & Mfg. Co., Pittsburgh, Pa.
Northern Indiana Brass Co., Elkhart, Ind.
● Ric-wiL Co., Cleveland, O.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
United States Rubber Co., New York, N. Y.
● Zallea Brothers, Wilmington, Del.

JOINTS, PIPE, EXPANSION, SLIP

● American District Steam Co., North Tonawanda, N. Y.
Belfield Valve Div. of Minneapolis-Honeywell, Philadelphia, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Clow & Sons, James B., Chicago, Ill.
● Crane Co., Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Howard Iron Works & Alberger Heater Div., Buffalo, N. Y.
● Illinois Engineering Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
Northern Indiana Brass Co., Elkhart, Ind.
Parks-Cramer Co., Fitchburg, Mass. (jacketed)
Powell Co., Wm., Cincinnati, O.
● Ric-wiL Co., Cleveland, O.
Schade Valve Mfg. Co., Philadelphia, Pa.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
● Walworth Co., New York, N. Y.
● Webster & Co., Warren, Camden, N. J.
● Yarnall-Waring Co., Philadelphia, Pa.

JOINTS, PIPE, FLEXIBLE, SWING AND REVOLVING

Barco Mfg. Co., not Inc., Chicago, Ill.
Bordo Co., Inc., L. J., Glenside, Pa.
Chiksan Co., Brea, Calif.
Flexo Supply Co., Inc., St. Louis, Mo.
Gil-Lair Products, Inc., Pasadena, Calif.
Hinderliter Tool Co., The, Div. of the H. K. Porter Co., Inc., Tulsa, Okla.
Johnson Corp., The, Three Rivers, Mich.
Mayson Mfg. Co., Inc., Detroit, Mich.
Moran Flexible Joint Co., Inc., Louisville, Ky.
Patterson-Ballagh Corp., Los Angeles, Calif.
Powell Co., Wm., Cincinnati, O.
● Spraying Systems Co., Bellwood, Ill.

JOINTS, UNIVERSAL, FOR OPERATING VALVES

Blackburn-Smith Mfg. Co., Hoboken, N. J.
Blood Brothers Machine Co., Allegan, Mich.
Brooks Equipment Corp., Hoboken, N. J.
● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Consolidated Car-Heating Co., Inc., Albany, N. Y.
Lovejoy Flexible Coupling Co., Chicago, Ill.
Piezo Mfg. Corp., New York, N. Y.
Stow Mfg. Co., Binghamton, N. Y. (flexible shafts)

KATA THERMOMETERS

See Thermometers, Kata

LACQUERS

See Enamels and Lacquers

LAGGING ADHESIVES

See Adhesives, for Pipe Covering

LAMPS, STERILIZING, FOR DUCT INSTALLATION

Coleman-Petterson Corp., Cleveland, O.
General Electric Co., Lamp Dept., Cleveland, O.
Hanovia Chemical & Mfg. Co., Newark, N. J.
Lustra Corp. of America, Brooklyn, N. Y.
● Westinghouse Electric Corp., Pittsburgh, Pa.

LEAD PIPE

See Pipe and Tubing, Lead and Lead Alloy

LEAD SHEETS

See Sheets, Lead

LEAD TUBING

See Pipe and Tubing, Lead and Lead Alloy

LEAK DETECTORS

See Detectors, Leak, Refrigerant

LEATHER BELTING

See Belting, Flat, Leather

LEATHER PACKING

See Packing, Leather

LIGHTS, PILOT AND SIGNAL

Armstrong Control Co., Inc., Portland, Ore.
Cooper Co., Clark, Palmyra, N. J.
Dial Light Co. of America, Inc., New York, N. Y.
● General Controls Co., Glendale, Calif.
General Electric Co., Lamp Dept., Cleveland, O.
Hart Mfg. Co., The, Hartford, Conn.
Signal Indicator Co., New York, N. Y.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
● Westinghouse Electric Corp., Pittsburgh, Pa.

LINKS, FUSIBLE

● Grinnell Co., Inc., Providence, R. I.
Morse-Smith-Morse, Inc., Watertown, Mass.
Preferred Utilities Mfg. Corp., New York, N. Y.

LIQUID LEVEL GAGES

See Gages, Liquid Level

LIQUID LEVEL INDICATORS

See Indicators, Liquid Level

LIQUID LEVEL RECORDERS

See Recorders, Liquid Level

LIQUID LEVEL REGULATORS

See Regulators, Liquid Level

LIQUID PRESSURE REGULATORS

See Regulators, Pressure, Liquid

LOCATORS, PIPE, UNDERGROUND

Fisher Research Laboratory, Inc., Palo Alto, Calif.
Globe Phone Mfg. Co., Reading, Mass.
Wilkinson Products Co., Los Angeles, Calif.

LOCK FORMING MACHINES

See Machines, Pittsburgh Lock Forming

LOCK NUTS

See Nuts, Lock

LOUVERS AND SHUTTERS, AUTOMATICALLY OR MANUALLY CONTROLLED

● Air Conditioning Products Co., Detroit, Mich.
Air Control Products, Inc., Coopersville, Mich.
● Air & Refrigeration Corp., New York, N. Y.
Airecon Industries, Detroit, Mich.
Airmaster Corp., Chicago, Ill.
Allen Ventilator Div., Production Planning Co., Rochester, Mich.
American Coolair Corp., Jacksonville, Fla.
American Foundry & Furnace Co., Bloomington, Ill.
American Warming & Ventilating Co., Toledo, O.
Arex Co., Chicago, Ill.
B & B Tool & Specialty Co., The, Dayton, O.
Barber-Colman Co., Rockford, Ill.
Belter Electric Mfg. Co., G. J., The, St. Louis, Mo.
Biersach & Niedermeyer Co., Milwaukee, Wis.
● Bishop & Babcock Mfg. Co., Cleveland, O.
● Buffalo Forge Co., Buffalo, N. Y.
Burt Mfg. Co., Akron, O.
Campbell Heating Co., E. K., Kansas City, Mo.
Century Fan & Ventilator Co., Stamford, Conn.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., Inc., Irvington, N. J.
Circulators & Devices Mfg. Corp., New York, N. Y.
Conoflow Corp., Philadelphia, Pa.
Dana Fan & Blower Corp., Cincinnati, O.
● De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Decatur Iron & Steel Co., Decatur, Ala.
Dual-Air Fan Co., South Elgin, Ill.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Elgo Shutter & Mfg. Co., Detroit, Mich.
Empire Ventilation Equipment Co., Long Island City, N. Y. (stationary)
● General Blower Co., Morton Grove, Ill.
Ilg Electric Ventilating Co., Chicago, Ill.

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International Engineering, Inc., Dayton, O.
Jamieson Mfg. Co., Dallas, Tex.
Jordan & Co., Inc., Paul R., Indianapolis, Ind.
Kane Mfg. Corp., Kane, Pa.
Kelvin-White Co., Boston, Mass.
● King Co., The, Owatonna, Minn.
Lau Blower Co., Dayton, O.
Lockjoint Wood Products Co., Wichita, Kans. (Wood; stationary door, wall, window and ceiling)
Martin Fan & Blower Co., Chicago, Ill.
Maysteel Products, Inc., Milwaukee, Wis.
Meier Electric & Machine Co., Inc., Indianapolis, Ind.
Meyer Mfg. Co., Detroit, Mich.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Myers Electric Co., Inc., Pittsburgh, Pa.
● Nelson Corp., Herman, Moline, Ill.
Peerless Electric Co., Warren, O.
Reed Unit-Fans, Inc., New Orleans, La.
● Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Richmond Fireproof Door Co., Richmond, Ind.
Riggin Metal Products, Inc., Kankakee, Ill.
Robertson Co., H. H., Pittsburgh, Pa.
Schoedinger, F. O., Columbus, O.
Shallcross Controls, Inc., Milwaukee, Wis.
Signal Electric Mfg. Co., Menominee, Mich.
Sioux Steel Co., Sioux Falls, S. D.
Southbridge Roofing Co., Inc., Southbridge, Mass.
● Standard Stamping & Perforating Co., Chicago, Ill.
● Swartwout Co., Cleveland, O.
● Tuttle & Bailey, Inc., New Britain, Conn.
United States Gypsum Co., Chicago, Ill.
United States Register Co., Battle Creek, Mich.
Utility Appliance Corp., Los Angeles, Calif.
Van Noorden Co., E., Boston, Mass.
Victor Electric Products, Inc., Cincinnati, O.

LOW WATER CUT-OFFS

See Cut-Offs, Low Water, Heating Boiler

MACHINES, BALANCING

See Equipment, Balancing

MACHINES, BLUE PRINT AND WHITE PRINT

For Reproducing Engineering Drawings

American Photocopy Equipment Co., Chicago, Ill.
Bruning Co., Inc., Charles, Chicago, Ill.
Dietzgen Co., Eugene, Chicago, Ill.
Ozalid Div. of General Aniline & Film Corp., Johnson City, N. Y.
Paragon-Revolute Corp., Rochester, N. Y.
Pease Co., C. F., The, Chicago, Ill.
Peck & Harvey, Chicago, Ill.
Wickes Brothers, Saginaw, Mich.

MACHINES AND FILM, X-RAY

du Pont de Nemours & Co., E. I., Photo Products Dept., Wilmington, Del.
Eastman Kodak Co., Rochester, N. Y.
Kelley Koett Mfg. Co., The, Covington, Ky.
North American Philips Co., Inc., Mt. Vernon, N. Y.
● Westinghouse Electric Corp., Pittsburgh, Pa.

MACHINES, FLANGING, PIPE AND TUBE

Leonard Precision Products Co., Garden Grove, Calif.

MACHINES, FLARING, PIPE AND TUBE

Leonard Precision Products Co., Garden Grove, Calif.

MACHINES, PIPE CLEANING

American Wheelabrator & Equipment Corp., Mishawaka, Ind. (for preparation of surface prior to coating)
Continental Machine Co., Chicago, Ill.
Spartan Tool Co., Chicago, Ill.
Wilson, Inc., Thomas C., Long Island City, N. Y.

MACHINES, PIPE CUTTING AND THREADING, PORTABLE

American Die & Tool Co., Inc., Reading, Pa.
Beaver Pipe Tools, Inc., Warren, O.
Century Engineering Co., Los Angeles, Calif.
Curtis & Curtis Co., The, Bridgeport, Conn.
Landis Machine Co., Inc., Waynesboro, Pa.
Muncie Gear Wks., Inc., Muncie, Ind.
Oster Mfg. Co., Cleveland, O.
Quijada Tool Co., Inc., Los Angeles, Calif.
● Ridge Tool Co., Elyria, O. (Hand)
Ter-I-Day Sales Co., Detroit, Mich.
Toledo Pipe Threading Machine Co., Toledo, O.
V-Mac Industries, Guilford, Conn.

MACHINES, PIPE CUTTING AND THREADING, STATIONARY

Bignall & Keeler Div., John Ramming Machine Co., St. Louis, Mo.
Curtis & Curtis Co., The, Bridgeport, Conn.
Landis Machine Co., Inc., Waynesboro, Pa.
Obear, E. L., Los Angeles, Calif.
Oster Mfg. Co., Cleveland, O.
Quijada Tool Co., Inc., Los Angeles, Calif.
Saunders Machine & Tool Corp., Yonkers, N. Y.
Stratford Pipe Scalloper Machine Co., Stratford, Conn.
Toledo Pipe Threading Machine Co., Toledo, O.
V-Mac Industries, Guilford, Conn.

MACHINES, PITTSBURGH LOCK FORMING

Dahlstrom Machine Works, Chicago, Ill.
Lockformer Co., Chicago, Ill.
Maplewood Machinery Co., Inc., Chicago, Ill.
Whitney Metal Tool Co., Rockford, Ill.

MACHINES, REFRIGERATION, ABSORPTION

● Carrier Corp., Syracuse, N. Y.
Vogt Machine Co., Henry, Louisville, Ky.
Worthington Pump & Machinery Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
● York Corp., York, Pa.,

MACHINES, SLIP ROLL FORMING

Altens Foundry & Machine Works, Inc., Lancaster, O.
Barth Mfg. Co., Milldale, Conn.
Hendley & Whittmore Co., Beloit, Wis.
● Milton Equipment Co., Philadelphia, Pa.
Niagara Machine & Tool Wks., Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
San Angelo Foundry & Machine Co., San Angelo, Tex.
Wysong & Miles, Greensboro, N. C.

MACHINES, TESTING, WELD

Air Reduction Sales Co., New York, N. Y.
Dillon Co., Inc., W. C., Chicago, Ill.
Olsen Testing Machine Co., Tinius, Willow Grove, Pa.

MAGNESIUM ALLOY SHEETS

See Sheets, Magnesium Alloy

MAGNESIUM TUBING

See Tubing, Magnesium

MALLEABLE UNIONS

See Unions, Malleable

MANIFOLDS, REFRIGERATION

Ball Welding Works, Inc., Oakland, Calif.
● Doyle & Roth Mfg. Co., Brooklyn, N. Y.
● Frick Co., Waynesboro, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Mueller Brass Co., Port Huron, Mich.
Reco Products Div., Refrigeration Engineering Corp, Philadelphia, Pa.
Superior Valve and Fittings Co., Pittsburgh, Pa.
U. S. Pipe & Mfg. Co., San Francisco, Calif.
Vilter Mfg. Co., Milwaukee, Wis.
Weatherhead Co., Cleveland, O.
● York Corp., York, Pa.

MANOMETERS

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Co., Chas. M., San Francisco, Calif.
Barton Instrument Co., Los Angeles, Calif.
Bristol Co., The, Waterbury, Conn.
Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Builders-Providence Inc., Div. of Builders Iron Foundry, Providence, R. I.
Defender Instrument and Regulator Co., St. Louis, Mo.
Dwyer Mfg. Co., F. W., Chicago, Ill.
● Hays Corp., Michigan City, Ind.
Hill, E. Vernon & Co., Chicago, Ill.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
King Engineering Corp., Ann Arbor, Mich.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Meriam Instrument Co., The, Cleveland, O.
Precision Scientific Co., Chicago, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Refinite Corp., Omaha, Neb.
Republic Flow Meters Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
United States Gauge, Div. of American Machine & Metals, Inc., Sellersville, Pa.
Wallace & Tiernan Co., Inc., Newark, N. J.

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MECHANICAL DRIVE TURBINES

See Turbines, Mechanical Drive

MECHANICAL SPEED CHANGERS

See Changers, Speed, Mechanical

MECHANICAL TRAPS

See Traps, Steam, Mechanical

MERCURY SWITCHES

See Switches, Mercury

METAL HOSE

See Hose, Metal and Fittings

METAL, POROUS, FOR FILTRATION, SEPARATION, DIFFUSION AND FLOW CONTROL

Keystone Carbon Co., Inc., St. Marys, Pa.
Moraine Products Div., General Motors Corp., Dayton, O.

METALLIC BELLOWS

See Bellows, Thermostatic and Metallic

METALLIC PACKING

See Packing, Metallic

METERS, AIR VELOCITY, DIRECT READING

● Anemostat Corp. of America, New York, N. Y.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
● Hastings Instrument Co., Hampton, Va.
● Hays Corp., Michigan City, Ind.
● Illinois Testing Laboratories, Inc., Chicago, Ill.
Taylor Instrument Companies, Rochester, N. Y.

METERS, CONDENSATION

● American District Steam Co., North Tonawanda, N. Y.
Buffalo Meter Co., Buffalo, N. Y.
Central Station Steam Co., Detroit, Mich.
Neptune Meter Co., New York, N. Y.

METERS, FLOW, REFRIGERANT

Bailey Meter Co., Cleveland, O.
Barton Instrument Co., Los Angeles, Calif.
Bristol Co., The, Waterbury, Conn.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Fischer & Porter Co., Hatboro, Pa.
● Hays Corp., Michigan City, Ind.
Moore Products Co., Philadelphia, Pa.
Neptune Meter Co., New York, N. Y.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Trimount Instrument Co., Chicago, Ill.
United States Gauge, Div. of American Machine & Metals, Inc., Sellersville, Pa.

METERS, FLOW, STEAM

● American District Steam Co., North Tonawanda, N. Y.
American Meter Co., Inc., New York, N. Y.
Bailey Meter Co., Cleveland, O.
Barton Instrument Co., Los Angeles, Calif.
Bristol Co., The, Waterbury, Conn.
Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Hagan Corp., Pittsburgh, Pa.
● Hays Corp., Michigan City, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia, Pa.
Meriam Instrument Co., The, Cleveland, O.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Taylor Instrument Companies, Rochester, N. Y.
Trimount Instrument Co., Chicago, Ill.

METERS, PROCESS LIQUID

American Meter Co., Inc., New York, N. Y.
Bailey Meter Co., Cleveland, O.
Barton Instrument Co., Los Angeles Calif.
Bowser, Inc., Fort Wayne, Ind.
Bristol Co., The, Waterbury, Conn.
Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Buffalo Meter Co., Buffalo, N. Y.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
● Hays Corp., Michigan City, Ind.
Meriam Instrument Co., The, Cleveland, O.
Moore Products Co., Philadelphia, Pa.
Neptune Meter Co., New York, N. Y.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Pittsburgh Equitable Meter Div., Rockwell Mfg. Co., Pittsburgh, Pa.
Republic Flow Meters Co., Chicago, Ill.
Roots-Connersville Blower Corp., Connersville, Ind.
Schutte & Koerting Co., Philadelphia, Pa.
Taylor Instrument Companies, Rochester, N. Y.
Trimount Instrument Co., Chicago, Ill.
Worthington-Gamon Meter Co., Newark, N. J.

METERS, VOLUME, AIR AND GAS

American Meter Co., Inc., New York, N. Y.
Bristol Co., The, Waterbury, Conn.
Fischer & Porter Co., Hatboro, Pa.
● Hastings Instrument Co., Hampton, Va.
● Hays Corp., Michigan City, Ind.
Meriam Instrument Co., The, Cleveland, O.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Pittsburgh Equitable Meter Div., Rockwell Mfg. Co., Pittsburgh, Pa.
Roots-Connersville Blower Corp., Connersville, Ind.
Schutte & Koerting Co., Philadelphia, Pa.
Selas Corp. of America, Philadelphia, Pa.
Taylor Instrument Companies, Rochester, N. Y.
Wallace & Tiernan Co., Inc., Newark, N. J.

METERS, WATER

Bailey Meter Co., Cleveland, O.
Buffalo Meter Co., Buffalo, N. Y.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Fischer & Porter Co., Hatboro, Pa.
Hersey Mfg. Co., South Boston, Mass.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
National Meter Co., Brooklyn, N. Y.
Neptune Meter Co., New York, N. Y.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Pfening Co., Fred D., Columbus, O. (batch measuring)
Pittsburgh Equitable Meter Div., Rockwell Mfg. Co., Pittsburgh, Pa.
Republic Flow Meters Co., Chicago, Ill.
Roots-Connersville Blower Corp., Connersville, Ind.
Schutte & Koerting Co., Philadelphia, Pa.
Union Water Meter Co., Worcester, Mass.
United States Gauge, Div. of American Machine & Metals, Inc., Sellersville, Pa.
Worthington-Gamon Meter Co., Newark, N. J.

MIXING VALVES

See Valves, Mixing, Steam and Water

MODULATING VALVES

See Valves, Radiator, Steam and Hot Water Modulating

MOTOR BASES

See Bases and Pads, Vibration Isolating; Bases, Motor Tension Adjusting

MOTOR CONTROLLERS

See Controllers and Starters, Motor

MOTOR OPERATED VALVES

See Valves, Motor Operated

MOTOR STARTERS

See Controllers and Starters, Motor

MOTORS, ELECTRIC, FRACTIONAL HP

Ace Electric Corp., Bedford, Ind.
● Alliance Mfg. Co., Alliance, O. (Shaded pole)
● Baldor Electric Co., St. Louis, Mo.
Barber-Colman Co., Rockford, Ill.
Bodine Electric Co., Chicago, Ill.
Brown-Brockmeyer Co., Inc., Dayton, O.
Burke Electric Co., Div. of Marathon Electric Mfg. Corp., Erie, Pa.
Canatsey Electric Mfg. Co., Kansas City, Mo.
● Century Electric Co., St. Louis, Mo.
Clark Electric Co., Memphis, Tenn.
Crise Mfg. Co., The, Columbus, O.
Crozier Machine Tool Co., Hawthorne, Calif.
Delco Appliance Div., General Motors Corp., Rochester, N. Y.
Delco Products Div., General Motors Corp., Dayton, O.
Diehl Mfg. Co., Somerville, N. J.
Eastern Air Devices, Inc., Brooklyn, N. Y.

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Emerson Electric Mfg. Co., The, St. Louis, Mo.
FASCO Industries, Inc., Rochester, N. Y.
Fairbanks, Morse & Co., Chicago, Ill.
Franklin Electric Co., Inc., Bluffton, Ind.
General Die and Stamping Co., New York, N. Y.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Hansen Mfg. Co., Inc., Princeton, Ind.
Holtzer-Cabot Div. The Leland Electric Co., Dayton, O.
Hoover Co., Kingston-Conley Div., North Plainfield, N. J.
Howell Electric Motors Co., Howell, Mich.
Jack & Heintz Precision Industries, Inc., Cleveland, O.
Kraus Co., Walter S., Woodside, L. I., N. Y.
Lamb Electric Co., Kent, O.
Leland Electric Co., Dayton, O.
Lima Electric Motor Co., Lima, O.
Marathon Electric Mfg. Corp., Wausau, Wis.
Master Electric Co., Dayton, O.
● Moore Co., The, Marceline, Mo. (Slow speed fan motors)
Ohio Electric Mfg. Co., Cleveland, O.
Peerless Electric Co., Warren, O.
Piqua Machine & Mfg. Co., Piqua, O.
Portable Electric Tools, Inc., Chicago, Ill.
Redmond Co., Inc., Owosso, Mich.
Reynolds Electric Co., River Grove, Ill.
Robbins & Myers, Inc., Springfield, O.
Rotor Corp., Miamisburg, O.
Royal Mfg. Corp., Waterloo, Ind.
Russell Electric Co., Chicago, Ill.
Signal Electric Mfg. Co., Menominee, Mich.
Small Motors Inc., Chicago, Ill.
Smith Corp., A. O., Milwaukee, Wis.
Speedway Mfg. Co., Chicago (Cicero), Ill.
Standard Motor Corp., Elyria, O.
Torq Electric Mfg. Corp., Bedford, O.
U. S. Electrical Motors, Inc., Los Angeles, Calif.
Victor Electric Products, Inc., Cincinnati, O.
● Wagner Electric Corp., St. Louis, Mo.
● Westinghouse Electric Corp., Pittsburgh, Pa.
Whirlaway Motors, Inc., Tipp City, O.

MOTORS, ELECTRIC, 1 HP AND OVER

● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Allis Co., Louis, The, Milwaukee, Wis.
● Baldor Electric Co., St. Louis, Mo.
Bogue Electric Co., Paterson, N. J.
Brown-Brockmeyer Co., Inc., Dayton, O.
Burke Electric Co., Div. of Marathon Electric Mfg. Corp., Erie, Pa.
● Century Electric Co., St. Louis, Mo.
Clark Electric Co., Memphis, Tenn.
Continental Electric Co., Inc., Newark, N. J.
Crocker-Wheeler Div., Elliott Co., Ampere, N. J.
Delco Products Div., General Motors Corp., Dayton, O.
Diehl Mfg. Co., Somerville, N. J.
Electric Machinery Mfg. Co., Minneapolis, Minn.
Electro Dynamic, Div. of the Electric Boat Co., Bayonne, N. J.
Emerson Electric Mfg. Co., The, St. Louis, Mo.
Fairbanks, Morse & Co., Chicago, Ill.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Hertner Electric Co., The, Cleveland, O.
Holtzer-Cabot Div., The Leland Electric Co., Dayton, O.
Hoover Co., Kingston-Conley Div., North Plainfield, N. J.
Howell Electric Motors Co., Howell, Mich.
Ideal Electric & Mfg. Co., Mansfield, O.
Imperial Electric Co., Akron, O.
Jackson Co., Byron, Los Angeles, Calif. (Submersible)
Kraus Co., Walter S., Woodside, L. I., N. Y.
Leland Electric Co., Dayton, O.
Lima Electric Motor Co., Lima, O.
Marathon Electric Mfg. Corp., Wausau, Wis.
Marble-Card Electric Co., Gladstone, Mich.
Master Electric Co., Dayton, O.
● Moore Co., The, Marceline, Mo. (Slow speed fan motors)
Peerless Electric Co., Warren, O.
Reliance Electric & Engineering Co., Cleveland, O.
Reuland Electric Co., Alhambra, Calif.
Robbins & Myers, Inc., Springfiled, O.
Smith Corp., A. O., Milwaukee, Wis.
Star Electric Motor Co., Bloomfield, N. J.
Sterling Electric Motors, Inc., Los Angeles, Calif.
U. S. Electrical Motors, Inc., Los Angeles, Calif.
● Wagner Electric Corp., St. Louis, Mo.
● Westinghouse Electric Corp., Pittsburgh, Pa.
Whirlaway Motors, Inc., Tipp City, O.

MOUNTINGS, VIBRATION

See Bases and Pads, Vibration Isolating

MUFFLERS, HOT GAS, FOR REFRIGERANT LINES

Armstrong Co., Richard M., Westchester, Pa.

MUSHROOM VENTILATORS

See Ventilators, Mushroom

NEUTRALIZERS, ACID

See Dehydrant and Acid Neutralizer

NEUTRALIZERS, ODOR

See Adsorbers, Odor

NICKEL AND NICKEL ALLOY PIPE AND FITTINGS

See Tubing, Nickel and Alloy; Fittings, Pipe, Nickel and Nickel Alloy; Pipe, Nickel and Nickel Alloy

NICKEL AND NICKEL ALLOY SHEETS

See Sheets, Nickel and Nickel Alloy

NIPPLES, PIPE, BRASS AND COPPER

Acheson Mfg. Co., Rankin, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Nipple Mfg. Co., Cicero, Ill.
Columbus Mfg. & Supply Co., Columbus, O.
● Couplings Co., Chicago, Ill.
● Crane Co., Chicago, Ill.
Ellsworth Pipe & Supply Co., Milwaukee, Wis.
G & H Mfg. Co., Philadelphia, Pa.
Grabler Mfg. Co., Cleveland, O.
Imperial Brass Mfg. Co., Chicago, Ill.
Mueller Brass Co., Port Huron, Mich.
Oil Equipment Mfg. Corp., New Haven, Conn.
Parker Appliance Co., The, Cleveland, O.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
Star Tubular Products Co., Chicago, Ill.
● Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
Weatherhead Co., Cleveland, O.

NIPPLES, PIPE, FLEXIBLE

● Bendix Aviation Corp., Eclipse-Pioneer Div., Teterboro, N. J.
● Davis Engineering Corp., Elizabeth, N. J.

NIPPLES, PIPE, IRON AND STEEL

Alabama Pipe Co., Anniston, Ala. (Cast iron)
Alloy Steel Products Co., Linden, N. J. (Stainless steel)
Byers Co., A. M., Pittsburgh, Pa. (Wrought iron)
Chicago Nipple Mfg. Co., Cicero, Ill.
Clow & Sons, James B., Chicago, Ill.
Columbus Mfg. & Supply Co., Columbus, O.
● Crane Co., Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa. (Swage)
Ellsworth Pipe & Supply Co., Milwaukee, Wis.
Flori Pipe Co., The, St. Louis, Mo.
Grabler Mfg. Co., Cleveland, O.
● Grinnell Co., Inc., Providence, R. I.
Hasco Valve & Machine Co., Milwaukee, Wis. (Stainless steel and alloy only)
Illinois Malleable Iron Co., Chicago, Ill.
Larkin Packer Co., St. Louis, Mo.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
Star Tubular Products Co., Chicago, Ill.
● Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
Wheeling Machine Products Co., Wheeling, W. Va.

NIPPLES, PIPE, NICKEL AND NICKEL ALLOY

Cooper Alloy Foundry Co., The, Hillside, N. J.
● Crane Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
International Nickel Co., Inc., The, New York, N. Y.

NIPPLES, RADIATOR, SLIP AND SCREW

Plumb Mfg. Co., Utica, N. Y.

NOISE ELIMINATION FOR COOLING TOWERS

● Industrial Sound Control, Inc., Hartford, Conn., and Los Angeles, Calif.

NOISE ELIMINATORS

See Bases and Pads, Vibration Isolating; Hose, Metal and Fittings; Insulation, Sound Deadening

NOZZLES, ATOMIZING

Bahnson Co., Winston-Salem, N. C.
Benjamin Air Rifle Co., St. Louis, Mo.
Bete Fog Nozzle Co., Greenfield, Mass.
Binks Mfg. Co., Chicago, Ill.
Delavan Mfg. Co., Des Moines, Ia.
● Maid-O'-Mist, Inc., Chicago, Ill.
● Marley Co., Inc., The, Kansas City, Kans.
● Martocello & Co., Jos. A., Philadelphia, Pa.
Parks-Cramer Co., Fitchburg, Mass.
Ross Sprinkler Co., Pasadena, Calif.
Schutte & Koerting Co., Philadelphia, Pa.

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Spray Engineering Co., Somerville, Mass.
● Spraying Systems Co., Bellwood, Ill.
Supreme Electric Products Corp., Rochester, N. Y.
Water Cooling Corp., New York, N. Y.

NOZZLES, FLOODING

● Marley Co., Inc., The, Kansas City, Kans.
Water Cooling Corp., New York, N. Y.

NOZZLES, SPARGER, FOR TANK HEATING

Schutte & Koerting Co., Philadelphia, Pa.

NOZZLES, SPRAY

American Cooling Tower Co., Kansas City, Mo.
● April Showers Co., Inc., Washington, D. C.
Bahnson Co., Winston-Salem, N. C.
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Bayley Blower Co., Milwaukee, Wis.
Benjamin Air Rifle Co., St. Louis, Mo.
Bete Fog Nozzle Co., Greenfield, Mass.
Binks Mfg. Co., Chicago, Ill.
Black Mfg. Co., The, Baltimore, Md.
Blower Application Co., Milwaukee, Wis.
● Buffalo Forge Co., Buffalo, N. Y.
Chain Belt Co., Milwaukee, Wis.
● Clarage Fan Co., Kalamazoo, Mich.
Delavan Mfg. Co., Des Moines, Ia.
Dustlix Corp., Milwaukee, Wis.
Eclipse Air Brush Co., Inc., Newark, N. J.
Electric Sprayit Co., The, Sheboygan, Wis.
Fluor Corp., Ltd., The, Los Angeles, Calif.
● Grinnell Co., Inc., Providence, R. I.
Harry Cooling Towers, Inc., New York, N. Y.
International Moistening Co., Providence, R. I.
Link-Belt Co., Chicago, Ill.
● **Maid-O'-Mist, Inc., Chicago, Ill.**
● **Marley Co., Inc., The, Kansas City, Kans.**
● **Martocello & Co., Jos. A., Philadelphia, Pa.**
Monarch Mfg. Wks., Inc., Philadelphia, Pa.
National Engineering & Mfg. Co., Kansas City, Mo.
Parks-Cramer Co., Fitchburg, Mass.
Phillips Cooling Tower Co., Inc., New York, N. Y.
Rega Mfg. Co., Rochester, N. Y.
Rockwood Sprinkler Co., Worcester, Mass.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Ross Sprinkler Co., Pasadena, Calif.
Schutte & Koerting Co., Philadelphia, Pa.
Skinner Irrigation Co., Troy, O.
Spray Engineering Co., Somerville, Mass.
● Spraying Systems Co., Bellwood, Ill.
Supreme Electric Products Corp., Rochester, N. Y.
Thermal Industries, Indio, Calif.
Water Cooling Corp., New York, N. Y.
Water Cooling Equipment Corp., St. Louis, Mo.
● Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
● Yarnall-Waring Co., Philadelphia, Pa.

NUTS, LOCK

Chase Brass & Copper Co., Waterbury, Conn.
● **Crane Co., Chicago, Ill.**
Dzus Fastener Co., Inc., Babylon, N. Y.
Elastic Stop Nut Corp. of America, Union, N. J.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
● Grinnell Co., Inc., Providence, R. I.
Industrial Screw Co., Chicago, Ill.
Kwikon Co., Chicago, Ill.
Lamson & Sessions Co., Cleveland, O.
Locknut Corp. of America, Chicago, Ill.
MacLean-Fogg Lock Nut Co., Chicago, Ill.
Palnut Co., Irvington, N. J.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
● SKF Industries, Inc., Philadelphia, Pa.
Shakeproof, Inc., Chicago, Ill. (Lock washers)
Standard Pressed Steel Co., Jenkintown, Pa.
Swallow Airplane Co., Wichita, Kan.
Tinnerman Products, Inc., Cleveland, O.
● Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.

OBSERVATION BOILER PORTS

See Ports, Observation, Boiler

ODOR ADSORBERS

See Filters, Air; Adsorbers, Odor

ODOR NEUTRALIZERS

See Adsorbers, Odor; Compounds, Air Freshening

OIL BURNERS

See Burners, Oil

OIL COOLERS

See Coolers, Oil

OIL FIRED UNIT HEATERS

See Heaters, Unit, Oil Fired

OIL SEPARATORS

See Separators, Steam and Oil

OPERATORS, DAMPER, DUCT

Arens Controls, Inc., Chicago, Ill.
● Autempco Corp., New York, N. Y.
Automatic Products Co., Milwaukee, Wis.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Conoflow Corp., Philadelphia, Pa.
● General Controls Co., Glendale, Calif.
Hotstream Heater Co., Cleveland, O.
● Johnson Service Co., Milwaukee, Wis.
Kieley & Mueller, Inc., North Bergen, N. J.
Mason-Neilan Regulator Co., Boston, Mass.
● Minneapolis-Honeywell Regulator Co., **Minneapolis, Minn.**
Perfex Corp., Milwaukee, Wis.
● Powers Regulator Co., Chicago, Ill.
Sampsel Time Control, Inc., Spring Valley, Ill.
● Sarcotherm Controls, Inc., New York, N. Y.
Shallcross Controls, Inc., Milwaukee, Wis.
Tagliabue Corp., C. J., Newark, N. J.
● Taylor Instrument Companies, Rochester, N. Y.
Young Regulator Co., Cleveland, O.

OPERATORS, VALVE

● Autempco Corp., New York, N. Y.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Cutler-Hammer, Inc., Milwaukee, Wis.
Foxboro Co., Foxboro, Mass.
● **General Controls Co., Glendale, Calif.**
Grove Regulator Co., Oakland, Calif.
Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
● **Johnson Service Co., Milwaukee, Wis.**
Kieley & Mueller, Inc., North Bergen, N. J.
Mason-Neilan Regulator Co., Boston, Mass.
● **McDonnell & Miller, Inc., Chicago, Ill.**
● **Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.**
Perfex Corp., Milwaukee, Wis.
Philadelphia Gear Works, Inc., Philadelphia, Pa.
● **Powers Regulator Co., Chicago, Ill.**
Shallcross Controls, Inc., Milwaukee, Wis.
Tagliabue Corp., C. J., Newark, N. J.
● Taylor Instrument Companies, Rochester, N. Y.

ORIFICE FLANGES

See Flanges, Orifice

ORIFICE UNIONS

See Unions, Orifice

ORIFICES, RADIATOR

Armstrong Control Co., Inc., Portland, Ore.
● **Autempco Corp., New York, N. Y.**
● **Barnes & Jones, Inc., Boston, Mass.**
Cashin Co., W. D., Boston, Mass.
● **Dunham Co., C. A., Chicago, Ill.**
● **Illinois Engineering Co., Chicago, Ill.**
● **Johnson Service Co., Milwaukee, Wis.**
● **Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.**
New York Air Valve Corp., New York, N. Y.
● **Sarco Co., Inc., New York, N. Y.**
● Sarcotherm Controls, Inc., New York, N. Y.
Tallmadge & Co., Webster, East Orange, N. J.
● **Thrush & Co., H. A., Peru, Ind.**

OVERFIRE AIR JETS

See Jets, Overfire Air, for Smoke Abatement

OVER-PRESSURE UNLOADERS, FOR REFRIGERANTS

Black-Sivalls & Bryson, Inc., Kansas City, Mo.
● Henry Valve Co., Melrose Park, Ill.

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OZONE APPARATUS

Coroaire Heater Corp., The, Cleveland, O.
General Ozone Corp., Chicago, Ill.
Montgomery Bros., San Francisco, Calif.
Ozone Air Co., Grand Rapids, Mich.
United States Ozone Co. of America, Scottdale, Pa.
Welsbach Corp., The, Ozone Processes Div., Philadelphia, Pa.

PACKAGED HEAT PUMP UNITS

See Units, Air Conditioning, Reverse Refrigeration Cycle

PACKAGED STEAM GENERATORS

See Boilers, Steam Generating Units, Heating and Process

PACKING, ASBESTOS

Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Allpax Co., Inc., Mamaroneck, N. Y.
Anchor Packing Co., Philadelphia, Pa.
Austin-Mason Co., Everett, Mass.
Belmont Packing & Rubber Co., The, Philadelphia, Pa.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Chicago Specialty Mfg. Co., Chicago, Ill.
Crane Packing Co., Chicago, Ill.
Darcoid Co., Inc., New York, N. Y.
Durabla Mfg. Co., New York, N. Y.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Felt Products Mfg. Co., Chicago, Ill.
Garlock Packing Co., Palmyra, N. Y.
Gatke Corp., Chicago, Ill.
Goodyear Tire & Rubber Co., Akron, O.
Grant Wilson Inc., Chicago, Ill.
Greene, Tweed & Co., North Wales, Pa.
Johns-Manville, New York, N. Y.
Keasbey Co., Robert A., New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa.
Klingerit, Inc., New York, N. Y. (Sheet and rod)
Linear Incorporated, Philadelphia, Pa.
Metallo Gasket Co., New Brunswick, N. J.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Q-P Mfg. Co., Needham Heights, Mass.
Quaker Rubber Corp., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J.
● Sall Mountain Co., Chicago, Ill.
Union Asbestos & Rubber Co., Cicero, Ill.
United States Rubber Co., New York, N. Y.
Zimmerman Packing Co., Cincinnati, O.

PACKING, FIBER

American Felt Co., Glenville, Conn.
Anchor Packing Co., Philadelphia, Pa.
● Armstrong Cork Co., Lancaster, Pa.
Austin-Mason Co., Everett, Mass.
Belmont Packing & Rubber Co., The, Philadelphia, Pa.
Crane Packing Co., Chicago, Ill.
Darcoid Co., Inc., New York, N. Y.
Durabla Mfg. Co., New York, N. Y.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Endura Mfg. Corp., Quakertown, Pa.
Garlock Packing Co., Palmyra, N. Y.
Greene, Tweed & Co., North Wales, Pa.
Johns-Manville, New York, N. Y.
Keasbey Co., Robert A., New York, N. Y.
Linear Incorporated, Philadelphia, Pa.
Metallo Gasket Co., New Brunswick, N. J.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Products Research Co., Los Angeles, Calif.
Quaker Rubber Corp., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J.
Union Asbestos & Rubber Co., Cicero, Ill.
United States Rubber Co., New York, N. Y.
Zimmerman Packing Co., Cincinnati, O.

PACKING, LEATHER

Alexander Bros., Philadelphia, Pa.
Anchor Packing Co., Philadelphia, Pa.
Baldwin Belting, Inc., New York, N. Y.
Belmont Packing & Rubber Co., The, Philadelphia, Pa.
Chicago Belting Co., Chicago, Ill.
Davies & Co., Wayne, Westboro, Mass.
Excelsior Leather Washer Mfg. Co., Rockford, Ill.
Graton & Knight Co., Worcester, Mass.
Houghton & Co., E. F., Philadelphia, Pa.
Q-P Mfg. Co., Needham Heights, Mass.
Rhoads & Sons, J. E., Philadelphia, Pa.
Schieren Co., Chas. A., New York, N. Y.
Williams & Son, I. B., Dover, N. H.
Zimmerman Packing Co., Cincinnati, O.

PACKING, METALLIC

Allpax Co., Inc., Mamaroneck, N. Y.
Anchor Packing Co., Philadelphia, Pa.
Austin-Mason Co., Everett, Mass.
Belmont Packing & Rubber Co., The, Philadelphia, Pa.
Conneaut Plastic Metallic Packing Co., Conneaut, O.
Crane Packing Co., Chicago, Ill.
Darcoid Co., Inc., New York, N. Y.
Felt Products Mfg. Co., Chicago, Ill.
France Packing Co., Philadelphia, Pa.
Garlock Packing Co., Palmyra, N. Y.
Greene, Tweed & Co., North Wales, Pa.
Johns-Manville, New York, N. Y.
Klingerit, Inc., New York, N. Y. (Sheet & rod)
Linear Incorporated, Philadelphia, Pa.
National Engineering Products, Inc., Washington, D. C.
National Lead Co., New York, N. Y.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Q-P Mfg. Co., Needham Heights, Mass.
Quaker Rubber Corp., Philadelphia, Pa.
Union Asbestos & Rubber Co., Cicero, Ill.
United States Rubber Co., New York, N. Y.
Zimmerman Packing Co., Cincinnati, O.

PACKING, RUBBER AND SYNTHETIC

American Felt Co., Glenville, Conn.
Anchor Packing Co., Philadelphia, Pa.
● Armstrong Cork Co., Lancaster, Pa.
Arrowhead Rubber Co., Los Angeles, Calif.
Austin-Mason Co., Everett, Mass.
Belmont Packing & Rubber Co., The, Philadelphia, Pa.
Boston Woven Hose & Rubber Co., Cambridge, Mass.
Chicago Belting Co., Chicago, Ill.
Chicago Specialty Mfg. Co., Chicago, Ill.
Continental Rubber Wks., Erie, Pa.
Crane Packing Co., Chicago, Ill.
Darcoid Co., Inc., New York, N. Y.
Dow Corning Corp., Midland, Mich.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Felt Products Mfg. Co., Chicago, Ill.
Garlock Packing Co., Palmyra, N. Y.
Gates Rubber Co., Denver, Colo.
General Electric Co., Chemical Dept., Pittsfield, Mass.
Gil-Lair Products, Inc., Pasadena, Calif.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Graton & Knight Co., Worcester, Mass.
Greene, Tweed & Co., North Wales, Pa.
Hamilton Rubber Mfg. Corp., Trenton, N. J.
Houghton & Co., E. F., Philadelphia, Pa.
Johns-Manville, New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa.
Linear Incorporated, Philadelphia, Pa.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Products Research Co., Los Angeles, Calif.
Q-P Mfg. Co., Needham Heights, Mass.
Quaker Rubber Corp., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J.
Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, O.
Resistoflex Corp., Belleville, N. J.
Thermoid Co., Trenton, N. J.
United States Rubber Co., New York, N. Y.
United States Stoneware Co., New York, N. Y.
Zimmerman Packing Co., Cincinnati, O.

PANELS, PERFORATED, FOR AIR DIFFUSION

● Multi-Vent Div., Pyle-National Co., The, Chicago, Ill.
Simplex Ceiling Corp., New York, N. Y.

PARTS FOR HEATING AND AIR CONDITIONING EQUIPMENT

Ackermann Mfg. Co., Wheeling, W. Va.
Air & Refrigeration Corp., New York, N. Y. (insulated panels)
American Welding & Mfg. Co., Warren, O.
Berger Mfg. Div., Republic Steel Corp., Canton, O. (cabinets, housings, canopies)
Camloc Fastener Corp., New York, N. Y. (Fasteners for access panels and sheet metal)
Carey Mfg. Co., Philip, Lockland, Cincinnati, O. (Insulating panel for housing and duct construction)
Cincinnati Metalcrafts Inc., Cincinnati, O. (sheet metal fabricating)
Commercial Shearing & Stamping Co., Youngstown, O.
Detroit Stamping Co., Detroit, Mich.
Dover Metal Products Co., The, Canal Fulton, O.
Falstrom Co., Passaic, N. J. (Air conditioning cabinets, steel control panels)
Lindsay Structure, Inc., Skokie, Ill. (Cabinet construction for air conditioning and warm air heating equipment
Mueller Brass Co., Port Huron, Mich. (Specially fabricated copper tubing, machine formed tubes)
Rigidized Metals Corp., Buffalo, N. Y.

PILLOW BLOCK BEARINGS

See Bearings, Pillow Block

PILOT LIGHTS

See Lights, Pilot and Signal

PIPE, ALUMINUM

Aluminum Co. of America, Pittsburgh, Pa.
Colonial Alloy Co., Metals Div., Philadelphia, Pa.
● Midwest Piping & Supply Co., Inc., St. Louis, Mo.
● Revere Copper & Brass, Inc., New York, N. Y.
Reynolds Metals Co., Louisville, Ky.

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PIPE, ASBESTOS FIBER AND CEMENT

Johns-Manville, New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa.
United States Stoneware Co., New York, N. Y.

PIPE BENDERS

See Benders, Pipe

PIPE, BRASS AND COPPER

American Brass Co., Waterbury, Conn.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Hussey & Co., C. G., Pittsburgh, Pa.
Lewin-Mathes Co., Lewin Metals Div., St. Louis, Mo.
Mueller Brass Co., Port Huron, Mich.
Phelps Dodge Copper Products Corp., British American Tube Div., New York, N. Y.
Reading Tube Corp., Long Island City, N. Y.
● Revere Copper and Brass., Incorporated, New York, N. Y.
Viking Copper Tube Co., Cleveland, O.
Wolverine Tube Div. of Calumet and Hecla Consolidated Copper Co., Detroit, Mich.

PIPE, CAST IRON, PRESSURE, BELL AND SPIGOT

Alabama Pipe Co., Anniston, Ala.
American Cast Iron Pipe Co., Birmingham, Ala.
Central Foundry Co., New York, N. Y.
Clow & Sons, James B., Chicago, Ill.
● Duriron Co., Inc., Dayton, O. (Acid resting)
Inner-Tite Div. of Yara Engineering Corp., Elizabeth, N. J.
Lynchburg Foundry Co., Lynchburg, Va.
McWane Cast Iron Pipe Co., Birmingham, Ala.
Somerville Iron Works, Somerville, N. J.
United States Pipe & Foundry Co., Burlington, N. J.
Warren Foundry & Pipe Corp., New York, N. Y.

PIPE, CAST IRON, PRESSURE, FLANGED

Alabama Pipe Co., Anniston, Ala.
American Cast Iron Pipe Co., Birmingham, Ala.
Clow & Sons, James B., Chicago, Ill.
● Duriron Co., Inc., Dayton, O. (Acid resting)
Inner-Tite Div. of Yara Engineering Corp., Elizabeth, N. J.
Lynchburg Foundry Co., Lynchburg, Va.
McWane Cast Iron Pipe Co., Birmingham, Ala.
United States Pipe & Foundry Co., Burlington, N. J.
Warren Foundry & Pipe Corp., New York, N. Y.

PIPE, CAST IRON, THREADED

Alabama Pipe Co., Anniston, Ala.
American Cast Iron Pipe Co., Birmingham, Ala.
Clow & Sons, James B., Chicago, Ill.
McWane Cast Iron Pipe Co., Birmingham, Ala.
Somerville Iron Wks., Somerville, N. J.
United States Pipe & Foundry Co., Burlington, N. J.
Warren Foundry & Pipe Corp., New York, N. Y.

PIPE CLEANING COMPOUNDS

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PIPE COILS

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PIPE COUPLINGS

See Couplings, Pipe

PIPE COVERING, ADHESIVES

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PIPE CUTTERS

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PIPE CUTTING MACHINES

See Machines, Pipe Cutting and Threading

PIPE EXTRACTORS

See Extractors, Pipe

PIPE, FIBER

Brown Co., New York, N. Y.
Orangeburg Mfg. Co., Orangeburg, N. Y.

PIPE FITTINGS

See Fittings, Pipe

PIPE FLANGES

See Flanges, Pipe

PIPE, GLASS

Corning Glass Wks., Corning, N. Y.
Fischer & Porter Co., Hatboro, Pa.

PIPE HANGERS

See Hangers and Supports, Pipe

PIPE, HARD RUBBER

American Hard Rubber Co., New York, N. Y.
Goodrich Co., B. F., Akron, O.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Raybestos-Manhattan, Inc., Passaic, N. J.
Stokes Molded Products, Inc., Trenton, N. J.
United States Rubber Co., New York, N. Y.

PIPE INSULATION

See Insulation, Pipe

PIPE INSULATION ADHESIVES

See Adhesives, for Pipe Covering

PIPE, JACKETED

Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., Pittsburgh, Pa.
Flori Pipe Co., The, St. Louis, Mo.
Fluid Systems, Inc., New Haven, Conn.
Kaiser Co., E. B., Chicago, Ill.
● Midwest Piping & Supply Co., Inc., Inc., St. Louis, Mo.
Nooter Corp., St. Louis, Mo.
Parks-Cramer Co., Fitchburg, Mass.
Pittsburgh Pipe Coil & Bending Co., Etna, Pa.
● Ric-wiL Co., Cleveland, O.
Roessing Mfg. Co., Pittsburgh, Pa.
Shaw-Kendall Engineering Co., Toledo, O.

PIPE JOINT COMPOUNDS

See Cement and Compounds, Pipe Joint

PIPE LOCATORS

See Locators, Pipe, Underground

PIPE, LINED

American Brass Co., Waterbury, Conn. (Tin)
American Cast Iron Pipe Co., Birmingham, Ala. (Cement)
American Hard Rubber Co., New York, N. Y. (Rubber)
Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
Cement Lined Pipe Co., Lynn, Mass. (Cement)
Clow & Sons, James B., Chicago, Ill.
Division Lead Co., Chicago, Ill.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Gates Engineering Co., Wilmington, Del.
General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Goodrich Co., B. F., Akron, O. (Rubber-lined)
Heresite & Chemical Co., Manitowoc, Wis.
Jones & Laughlin Steel Corp., Pittsburgh, Pa. (Cement)
Kaiser Co., E. B., Chicago, Ill.
Knight, Maurice A., Akron, O.
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead and tin lined)
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Michigan Pipe Co., Bay City, Mich. (Wood)
National Lead Co., New York, N. Y. (Lead)
Nooter Corp., St. Louis, Mo.
Raybestos-Manhattan, Inc., Passaic, N. J. (Rubber)
Resisto Pipe & Valve Co., East Cambridge, Mass. (Lead)
United States Rubber Co., New York, N. Y. (Rubber)
United States Stoneware Co., New York, N. Y.
Warren Foundry & Pipe Corp., New York, N. Y. (Cement)
● Youngstown Sheet & Tube Co., Youngstown, O.

PIPE LINE STRAINERS

See Strainers, Pipe Line

PIPE, NICKEL AND NICKEL ALLOY

Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Globe Steel Tubes Co., Milwaukee, Wis.
International Nickel Co., Inc., The, New York, N. Y.
● Revere Copper and Brass, Incorporated, New York, N. Y.

PIPE NIPPLES

See Nipples, Pipe

PIPE, PLASTIC

Acadia Synthetic Products, Div., Western Felt Works, Chicago, Ill.
American Hard Rubber Co., New York, N. Y.
Commercial Plastics Co., Chicago, Ill.
Continental-Diamond Fibre Co., Newark, Del.
Extruded Plastics, Inc., Norwalk, Conn.
Haveg Corp., Newark, Del.
Mills Corp., Elmer E., Chicago, Ill.

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North Penn Co., New York, N. Y.
Panelyte Div., St. Regis Paper Co., New York, N. Y.
United States Stoneware Co., New York, N. Y.

PIPE, PRE-INSULATED

● Durant Insulated Pipe Co., Palo Alto, Calif.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Flexible Tubing Corp., Branford, Conn.
Kaiser Co., E. B., Chicago, Ill.
● Ric-wiL Co., Cleveland, O.

PIPE REAMERS

See Reamers, Pipe

PIPE REPAIR CLAMPS

See Clamps, Pipe Repair

PIPE, SPIRAL, RIVETED AND WELDED

Armco Drainage & Metal Products, Inc., Middletown, O.
Biggs Boiler Wks., Co., The, E. Akron, O.
Naylor Pipe Co., Chicago, Ill.
Nikoh Tube Co., Chicago, Ill.
● Taylor Forge & Pipe Wks., Chicago, Ill.

PIPE, STEEL, ALLOY

Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Globe Steel Tubes Co., Milwaukee, Wis.
National Tube Co., United States Steel Corp., Sub., Pittsburgh, Pa.
● Youngstown Sheet & Tube Co., Youngstown, O.

PIPE, STEEL, BUTT AND LAP WELDED

● Bethlehem Steel Co., Bethlehem, Pa.
Byers Co., A. M., Pittsburgh, Pa.
Chicago Metal Mfg. Co., Chicago, Ill.
Fretz-Moon Tube Co., Butler, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Laclede Steel Co., St. Louis, Mo.
National Tube Co., United States Steel Corp., Sub., Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Pittsburgh Tube Co., Pittsburgh, Pa.
Republic Steel Corp., Cleveland, O.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y. (Specially fabricated)
Smith Corp., A. O., Milwaukee, Wis.
South Chester Tube Co., Chester, Pa.
● Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Tippett & Wood, Phillipsburgh, N. J. (12 in. and larger)
● Wheatland Tube Co., Philadelphia, Pa.
Wheeling Steel Corp., Wheeling, W. Va.
● Youngstown Sheet & Tube Co., Youngstown, O.

PIPE, STEEL, SEAMLESS

Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Globe Steel Tubes Co., Milwaukee, Wis.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
National Tube Co., United States Steel Corp., Sub., Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
● Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Timken Roller Bearing Co., Canton, O.
● Youngstown Sheet & Tube Co., Youngstown, O.

PIPE, STEEL, STAINLESS

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
American Locomotive Co., Alco Products Div., New York, N. Y.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Globe Steel Tubes Co., Milwaukee, Wis.
National Tube Co., United States Steel Corp., Sub., Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Steel and Tubes Div., Cleveland, O.
Timken Roller Bearing Co., Canton, O.
Trent Tube Mfg. Co., East Troy, Wis.

PIPE, STONEWARE

General Ceramics & Steatite Corp., Keasbey, N. J.
Knight, Maurice A., Akron, O.
United States Stoneware Co., New York, N. Y.

PIPE SUPPORTS

See Hangers and Supports, Pipe

PIPE, TIN

Division Lead Co., Chicago, Ill.
Standard Rolling Mills, Inc., Brooklyn, N. Y.

PIPE TONGS

See Tongs, Pipe

PIPE, TUBING, FITTINGS AND VALVES, CARBON AND GRAPHITE

General Ceramics & Steatite Corp., Keasbey, N. J.
National Carbon Co., New York, N. Y.

PIPE AND TUBING, LEAD AND LEAD ALLOY

Alpha Metals, Inc., Brooklyn, N. Y.
Division Lead Co., Chicago, Ill.
Eagle-Picher Co., Cincinnati, O.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Flemm Lead Co., Inc., Long Island City, N. Y.
Gardiner Metal Co., Chicago, Ill.
Lissberger & Son, Inc., Marks, Long Island City, N. Y.
National Lead Co., New York, N. Y.
Northwest Lead Co., Seattle, Wash.
Rochester Lead Works, Inc., Rochester, N. Y.
Standard Rolling Mills, Inc., Brooklyn, N. Y.
United States Stoneware Co., New York, N. Y.

PIPE VISES

See Vises, Pipe

PIPE, VITRIFIED CLAY

Cannelton Sewer Pipe Co., RadianTile Div., Chicago, Ill.
● Ric-wiL Co., Cleveland, O.
Stillwater Clay Products Co., The, Cleveland, O.

PIPE, WOOD

● American District Steam Co., North Tonawanda, N. Y.
Caldwell Co., W. E., Louisville, Ky.
Michigan Pipe Co., Bay City, Mich.
Santa Fe Tank & Tower Co., Los Angeles, Calif.

PIPE WRENCHES

See Wrenches, Pipe

PIPE, WROUGHT IRON

Byers Co., A. M., Pittsburgh, Pa.

PIPING IDENTIFICATION MARKERS

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PISTON RINGS

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PITOT TUBES

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PITTSBURGH LOCK FORMING MACHINES

See Machines, Pittsburgh Lock Forming

PLASTIC PIPE AND PIPE FITTINGS

See Pipe, Plastic; Fittings, Pipe, Plastic

PLASTIC TUBING

See Tubing, Plastic

PLATES, FLOOR AND CEILING

Beaton & Cadwell Mfg. Co., New Britain, Conn.
Beaton & Corbin Mfg. Co., Southington, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Specialty Mfg. Co., Chicago, Ill.
Farley Sleeve & Hanger Co., Cleveland, O.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
G & H Mfg. Co., Philadelphia, Pa.
● Grinnell Co., Providence, R. I.
Hupp Corp., Globe Stamping Div., Cleveland, O.
Jarecki Mfg. Co., Erie, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keeney Mfg. Co., Newington, Conn.
Little Mfg. Co., M. S., Hartford, Conn.
● Ritter Pattern & Casting Co., Inc., New York, N. Y.
Russell Mfg. Co., John M., Naugatuck, Conn.
● Walworth Co., New York, N. Y.

PLUG COCKS

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PLUG VALVES

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PLUGS, FUSIBLE, BOILER

Chicago Specialty Mfg. Co., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Swift Lubricator Co., Elmira, N. Y.
● Walworth Co., New York, N. Y.

PLUGS, REPAIR, FOR TANKS

Chicago Specialty Mfg. Co., Chicago, Ill.
Rolyan Metal Products, Chicago, Ill.
Standard Pressed Steel Co., Jenkintown, Pa.
U. S. Plug & Fitting Co., Cleveland, O.

POROUS METAL

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PORTS, OBSERVATION, BOILER

Chicago Fire Brick Co., Chicago, Ill.
● Detroit Stoker Co., Detroit, Mich.
Green Fire Brick Co., Mexico, Mo.
National Airoil Burner Co., Inc., Philadelphia, Pa.
Plibrico Jointless Firebrick Co., Chicago, Ill.
Preferred Utilities Mfg. Corp., New York, N. Y.
Ramtite Co., The, Chicago, Ill.
Sims Co., Erie, Pa.
Springfield Boiler Co., Springfield, Ill.

POSITIONERS, WELDING

See Welding and Cutting Apparatus, Oxy-Acetylene

POWER SHEARS

See Shears, Power

PREHEATERS, FUEL OIL

● American District Steam Co., North Tonawanda, N. Y.
American Locomotive Co., Alco Products Div., New York, N. Y.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Brown Fintube Co., The, Elyria, O.
● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Cooper Co., Clark, Palmyra, N. J.
Crotty Mfg. Co., Flushing, L. I., N. Y.
● Davis Engineering Corp., Elizabeth, N. J.
Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., Pittsburgh, Pa.
Downingtown Iron Works, Downingtown, Pa.
● Doyle & Roth Mfg. Co., Brooklyn, N. Y.
Drying Sytems, Inc., Chicago, Ill.
Engineer Co., New York, N. Y.
Falcon Equipment Co., New Brighton, Pa.
Fluid Systems, Inc., New Haven, Conn.
General Fittings Co., Providence, R. I.
Griscom-Russell Co., New York, N. Y.
Heat Transfer Products, Inc., Carbondale, Pa.
Industrial Engineering & Equipment Co., St. Louis, Mo. (Electric)
Johnson Corp., The, Three Rivers, Mich.
Leyman Mfg. Corp., John H. McGowan Co., Div., Cincinnati, O.
Martin-Quaid Co., Philadelphia, Pa.
National Airoil Burner Co., Inc., Philadelphia, Pa.
National Pipe Bending Co., New Haven, Conn.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Peabody Engineering Corp., New York, N. Y.
Preferred Utilities Mfg. Corp., New York, N. Y.
Reliable Products Mfg. Co., Brooklyn, N. Y.
● Rempe Co., Chicago, Ill.
Richmond Engineering Co., Inc., Richmond, Va.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Sims Co., Erie, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
Staples & Pfeiffer, San Francisco, Calif.
Struthers Wells Corp., Titusville, Pa.
Taco Heaters, Inc., Providence, R. I.
● Thrush & Co., H. A., Peru, Ind.
Todd Shipyards Corp., Combustion Equipment Div., Elmhurst, L. I. N. Y.
Trent Inc., Philadelphia, Pa.
Vulcan Electric Co., Danvers, Mass.
● Whitlock Mfg. Co., Hartford, Conn.
● Wiegand Co., Edwin L., Pittsburgh, Pa. (Electric)
Yula Water Heaters Inc., New York, N. Y.

PREHEATERS AND STRESS RELIEVERS, ELECTRIC, FOR PIPE WELDS

Electric Arc, Inc., Newark, N. J.
Falcon Equipment Co., New Brighton, Pa.
Martin-Quaid Co., Philadelphia, Pa.
Trent Inc., Philadelphia, Pa.
● Wiegand Co., Edwin L., Pittsburgh, Pa.

PRE-INSULATED PIPE

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PRESSURE BLOWERS

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PRESSURE CONTROLLERS

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PRESSURE INDICATOR-CONTROLLERS

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PRESSURE RECORDERS

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PRESSURE REDUCING VALVES

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PRESSURE REGULATORS

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PROCESS STEAM SUPERHEATERS

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PROCESS AND STORAGE TANKS

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PROPELLER FANS

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PROPELLER PUMPS

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PROPORTIONING PUMPS

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PROTECTIVE COATINGS

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PROTECTORS, GAGE GLASS

Wright-Austin Co., Detroit, Mich.

PROTECTORS, PIPE COVERING

● American District Steam Co., North Tonawanda, N. Y.
Carpenter & Paterson, Inc., East Boston, Mass.
Childers Mfg. Co., Houston, Tex.
Cinder Products Corp., Providence, R. I.
Grant Wilson Inc., Chicago, Ill.
● Grinnell Co., Inc., Providence, R. I.
● Ric-wiL Co., Cleveland, O.

PSYCHROMETERS, MOTOR ASPIRATED

Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Hill, E. Vernon & Co., Chicago, Ill.
● Illinois Testing Laboratories, Inc., Chicago, Ill.
Tagliabue Corp., C. J., Newark, N. J.

PSYCHROMETERS, SLING AND HAND ASPIRATED

American Moistening Co., Providence, R. I.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
G. M. Mfg. Co., New York, N. Y.
General Scientific Equipment Co., Philadelphia, Pa.
● Grinnell Co., Inc., Providence, R. I.
H-B Instrument Co., Philadelphia, Pa.
Hill, E. Vernon & Co., Chicago, Ill.
● Johnson Service Co., Milwaukee, Wis.
Moeller Instrument Co., Richmond Hill, N. Y.
Palmer Thermometers, Inc., Cincinnati (Norwood), O.
Parks-Cramer Co., Fitchburg, Mass.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Scientific Instrument Co., Detroit, Mich.
● Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Weksler Thermometer Corp., New York, N. Y.
Weston Electrical Instrument Corp., Newark, N. J.

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PSYCHROSTATS

See Humidistats

PULLEYS AND SHEAVES, FOR BELT DRIVES

● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia, Pa.
Central Die Casting & Mfg. Co., Inc., Chicago, Ill. (V belt)
Chicago Die Casting Mfg. Co., Chicago, Ill. (v-type and flat type)
Congress Drives Div., Tann Corp., Detroit, Mich. (V belt—fractional and multiple horsepower)
● Dayton Rubber Co., Dayton, O.
Dick Co., Inc., R. & J., Passaic, N. J. (Steel split)
Doall Co., The, Des Plaines, Ill.
● Dodge Mfg. Corp., Mishawaka, Ind.
Gates Rubber Co., The, Denver, Colo.
Goldens' Foundry & Machine Co., Columbus, Ga. (Cast iron)
Horton Mfg. Co., Minneapolis, Minn. (Variable speed)
Lau Blower Co., Dayton, O.
Lewellen Mfg. Co., Columbus, Ind.
Lovejoy Flexible Coupling Co., Chicago, Ill.
Maurey Mfg. Corp., Chicago, Ill. (v-belt steel and cast iron)
Medart Co., St. Louis, Mo.
Pyott Foundry & Machine Co., Chicago, Ill.
Rockwood Mfg. Co., Inc., Indianapolis, Ind.
Schnacke, Inc., Evansville, Ind. (v-type)
Scientiae Tool Co., Dayton, O. (variable pitch)
Sprout-Waldron & Co., Muncy, Pa.
Swift Mfg. Co., Inc., Hazel Park, Mich. (Cast iron)
Thermoid Co., Trenton, N. J.
Utility Appliance Corp., Los Angeles, Calif.
V-Belt Clutch Co., Los Angeles, Calif.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Webster Electric Co., Racine, Wis.
Wood's Sons Co., T. B., Chambersburg, Pa.
Worthington Pump & Machinery Corp., Harrison, N. J. (v-type)

PULVERIZED COAL BURNERS

See Burners, Pulverized Coal

PUMP BASES

See Bases and Pads, Vibration Isolating

PUMP UNITS, FUEL OIL

See Units, Fuel Oil, Heating, Pumping and Straining

PUMP VALVES

See Valves, Pump

PUMPS, BOILER FEED

Acker Organizations, Inc., W. M., Cleveland, O.
Aldrich Pump Co., Allentown, Pa.
● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Aurora Pump Co., Aurora, Ill.
Austin-Mason Co., Everett, Mass.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
● Buffalo Pumps, Inc., Buffalo, N. Y.
● Chicago Pump Co., Chicago, Ill.
Cissell Mfg. Co., Inc., W. M., Louisville, Ky.
Coffin Co., J. S., Jr., Englewood, N. J.
Columbus Steam Pump Wks., Co., Columbus, O.
● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Cyclotherm Corp., Oswego, N. Y.
Davidson Co., M. T., Brooklyn, N. Y.
Dean Brothers Pumps, Inc., Indianapolis, Ind.
Dean Hill Pump Co., Indianapolis, Ind.
Decatur Pump Co., Decatur, Ill.
De Laval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
Domestic Engine & Pump Co., Shippensburg, Pa.
Dutton Co., C. H., Kalamazoo, Mich
● Eagan Co., Inc., Walter H., Philadelphia, Pa.
Eclipse Fuel Engineering Co., Rockford, Ill.
● Economy Pumps, Inc., Hamilton, O.
Everite Pump & Mfg. Co., Inc., Lancaster, Pa.
Faber Engineering Co., Inc., Philadelphia, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Frederick Iron & Steel Inc., Frederick, Md.
Gardner-Denver Co., Quincy, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
Ingersoll-Rand Co., New York, N. Y.
Jackson Co., Byron, Los Angeles, Calif.
Jacuzzi Bros., Inc., Richmond, Calif.
Johnson Corp., The, Three Rivers, Mich.
Kingsford Foundry & Machine Wks., Oswego, N. Y.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Lawrence Pump & Engine Co., Lawrence, Mass.
Lecourtenay Co., Newark, N. J.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
● McDonnell & Miller, Inc., Chicago, Ill.
Mears-Kane-Ofeldt, Inc., Philadelphia, Pa.
Morris Machine Works, Baldwinsville, N. Y.
● Nash Engineering Co., South Norwalk, Conn.
National Steam Pump Co., Upper Sandusky, O.
Oberdorfer Foundries, Inc., Syracuse, N. Y.
Pacific Pumping Co., Oakland, Calif.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Robbins & Myers, Inc., Springfield, O.
Roth Co., Roy E., Rock Island, Ill.
Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
● Skidmore Corp., St. Joseph, Mich.
Sta-Rite Products, Inc., Delavan, Wis.
● Sterling, Inc., Milwaukee, Wis.
Stout & Sons, David, St. Louis, Mo.
Swaby Mfg. Co., Chicago, Ill.
Union Steam Pump Co., Battle Creek, Mich.
Warren Steam Pump Co., Inc., Warren, Mass.
● Weil Pump Co., Chicago, Ill.
Weinman Pump Mfg. Co., The, Columbus, O.
● Whittington Pump & Engineering Corp., Indianapolis, Ind.
Worthington Pump & Machinery Corp., Harrison, N. J.
Yeomans Bros. Co., Chicago, Ill.

PUMPS, CENTRIFUGAL

Allen Billmyre Div., Lamson Corp., Syracuse, N. Y.
Alliance Industries, Huntingden Valley, Pa.
● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
American Well Wks., Aurora, Ill.
Aurora Pump Co., Aurora, Ill.
Barnes Manufacturing Co., Mansfield, O.
Barrett, Haentjens & Co., Hazleton, Pa.
Beach-Russ Co., New York, N. Y.
Beckett & Co., Inc., Thomas, Dallas, Tex.
● Bell & Gossett Co., Morton Grove, Ill.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Blaisdell Compressor Co., New York, N. Y.
● Buffalo Pumps, Inc., Buffalo, N. Y.
Bump Pump Co., LaCrosse, Wis.
Carver Pump Co., Muscatine, Ia.
Chain Belt Co., Milwaukee, Wis.
● Chicago Pump Co., Chicago, Ill.
Columbus Steam Pump Wks. Co., Columbus, O.
● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davidson Co., M. T., Brooklyn, N. Y.
Dean Brothers Pumps, Inc., Indianapolis, Ind.
Dean Hill Pump Co., Indianapolis, Ind.
Decatur Pump Co., Decatur, Ill.
De Laval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
Domestic Engine & Pump Co., Shippensburg, Pa.
● Dunham Co., C. A., Chicago, Ill.
● Duriron Co., Inc., Dayton, O. (Acid resisting)
● Eagan Co., Inc., Walter H., Philadelphia, Pa.
Eastern Industries Inc., New Haven, Conn.
● Economy Pumps, Inc., Hamilton, O.
Everite Pump & Mfg. Co., Inc., Lancaster, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Foster Pump Works, Inc., Brooklyn. N. Y.
Frederick Iron & Steel Inc., Frederick, Md.
Fulflo Specialties Co., Inc., The, Blanchester, O.
Gardner-Denver Co., Quincy, Ill.
General Ceramics & Steatite Corp., Keasbey, N. J. (Chemical stoneware)
Gorman-Rupp Co., Mansfield, O.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
Hypro Engineering Co., Minneapolis, Minn.
Ingersoll-Rand Co., New York, N. Y.
Jackson Co., Byron, Los Angeles, Calif.
Jacuzzi Bros., Inc., Richmond, Calif.
Kingsford Foundry & Machine Wks., Oswego, N. Y.
La Bour Co., Inc., The, Elkhart, Ind.
Lawrence Pump & Engine Co., Lawrence, Mass.
Lecourtenay Co., Newark, N. J.
Lewis & Co., Inc., Chas. S., St. Louis, Mo.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Little Giant Vaporizer Co., Inc., Oklahoma City, Okla.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Marlow Pumps, Ridgewood, N. J.
Morey, Dan, Los Angeles, Calif.
Morris Machine Works, Baldwinsville, N. Y.
Myers & Bro. Co., F. E., The, Ashland, O.
National Carbon Co., New York, N. Y.
Oberdorfer Foundries, Inc., Syracuse, N. Y.
Pacific Pumping Co., Oakland, Calif.
Palmer Electric Co., Detroit, Mich.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Pioneer Pump & Mfg. Co., Detroit, Mich.
Piqua Machine & Mfg. Co., Piqua, O.
Quimby Pump Div., H. K. Porter Co., Inc., Pittsburgh, Pa.
Red Jacket Mfg. Co., Davenport, Ia.
Schneible Co., Claude B., Detroit, Mich.
Schwitzer-Cummins Co., Indianapolis, Ind.
● Skidmore Corp., St. Joseph, Mich.
Smith Corp., A. O., Milwaukee, Wis.
Standard Electric Mfg. Co., West Berlin, N. J.
Sta-Rite Products, Inc., Delavan, Wis.
● Sterling, Inc., Milwaukee, Wis.

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- Swaby Mfg. Co., Chicago, Ill.
- Taber Pump Co., Buffalo, N. Y.
- ● Trane Co., The, LaCrosse, Wis.
- Union Steam Pump Co., Battle Creek, Mich.
- Utility Appliance Corp., Los Angeles, Calif.
- Valley Foundry & Machine Works, Inc., Fresno, Calif.
- Warren Steam Pump Co., Inc., Warren, Mass.
- Webb Co., The, Webb City, Mo.
- ● Weil Pump Co., Chicago, Ill.
- Weinman Pump Mfg. Co., The, Columbus, O.
- ● Whittington Pump & Engineering Corp. Indianapolis, Ind.
- Worthington Pump & Machinery Corp., Harrison, N. J.
- Yeomans Bros. Co., Chicago, Ill.

PUMPS, CONDENSATION RETURN

- ● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
- American Hydrovac, Inc., Brooklyn, N. Y.
- American Marsh Pumps, Inc., Battle Creek, Mich.
- Aurora Pump Co., Aurora, Ill.
- Blackburn-Smith Mfg. Co., Hoboken, N. J.
- ● Buffalo Pumps, Inc., Buffalo, N. Y.
- ● Chicago Pump Co., Chicago, Ill.
- Cissell Mfg. Co., Inc., W. M., Louisville, Ky.
- Cochrane Corp., Philadelphia, Pa.
- Coffin Co., J. S., Jr., Englewood, N. J.
- Columbus Steam Pump Wks. Co., Columbus, O.
- ● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
- Davidson Co., M. T., Brooklyn, N. Y.
- ● Dean Brothers Pumps, Inc., Indianapolis, Ind.
- Dean Hill Pump Co., Indianapolis, Ind.
- Decatur Pump Co., Decatur, Ill.
- De Laval Steam Turbine Co., Trenton, N. J.
- Deming Co., Salem, O.
- Domestic Engine & Pump Co., Shippensburg, Pa.
- ● Dunham Co., C. A., Chicago, Ill.
- Dutton Co., C. H., Kalamazoo, Mich.
- ● Eagan Co., Inc., Walter H., Philadelphia, Pa.
- Eastern Industries, Inc., New Haven, Conn.
- Eclipse Fuel Engineering Co., Rockford, Ill.
- ● Economy Pumps, Inc., Hamilton, O.
- Everite Pump & Mfg. Co., Inc., Lancaster, Pa.
- Faber Engineering Co., Philadelphia, Pa.
- Fairbanks, Morse & Co., Chicago, Ill.
- Frederick Iron & Steel Inc., Frederick, Md.
- Goulds Pumps, Inc., Seneca Falls, N. Y.
- Guild & Garrison, Inc., Brooklyn, N. Y.
- Heating Assurance, Inc., Spokane, Wash.
- ● Hoffman Specialty Co., Indianapolis, Ind.
- Ingersoll-Rand Co., New York, N. Y.
- Jackson Co., Byron, Los Angeles, Calif.
- Jacuzzi Bros., Inc., Richmond, Calif.
- Johnson Corp., The, Three Rivers, Mich.
- Kisco Boiler & Engineering Co., St. Louis, Mo.
- Lawrence Pump & Engine Co., Lawrence, Mass.
- Lecourtenay Co., Newark, N. J.
- Leyman Mfg. Corp., John H. McGowan Co., Div., Cincinnati, O.
- Mears-Kane-Ofeldt, Inc., Philadelphia, Pa.
- Myers & Bro. Co., F. E., The, Ashland, O.
- ● Nash Engineering Co., South Norwalk, Conn.
- Oberdorfer Foundries, Inc., Syracuse, N. Y.
- Oilux Co., Fort Wayne, Ind.
- Pacific Pumping Co., Oakland, Calif.
- Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
- Pennsylvania Pump & Compressor Co., Easton, Pa.
- Quimby Pump Div., H. K. Porter Co., Inc., Pittsburgh, Pa.
- Roth Co., Roy E., Rock Island, Ill.
- Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
- ● Sellers Engineering Co., Chicago, Ill.
- ● Skidmore Corp., St. Joseph, Mo.
- Sta-Rite Products, Inc., Delavan, Wis.
- Sterling Engineering & Mfg. Corp., Hyde Park, Mass.
- ● Sterling, Inc., Milwaukee, Wis.
- Stout & Sons, David, St. Louis, Mo.
- Swaby Mfg. Co., Chicago, Ill.
- Templeton Bros., Hyde Park, Mass.
- ● Trane Co., The, LaCrosse, Wis.
- Union Steam Pump Co., Battle Creek, Mich.
- Warren Steam Pump Co., Inc., Warren, Mass.
- ● Weil Pump Co., Chicago, Ill.
- Weinman Pump Mfg. Co., The, Columbus, O.
- ● Whittington Pump & Engineering Corp. Indianapolis, Ind.
- Worthington Pump & Machinery Corp., Harrison, N. J.
- Yeomans Bros. Co., Chicago, Ill.

PUMPS, DEEP WELL, TURBINE

- American-Marsh Pumps, Inc., Battle Creek, Mich.
- American Well Wks., Aurora, Ill.
- Aurora Pump Co., Aurora, Ill.
- Cook, Inc., A. D. Lawrenceburg, Ind.
- Davidson Co., M. T., Brooklyn, N. Y.
- Decatur Pump Co., Decatur, Ill. (shallow well)
- Deming Co., Salem, O.
- ● Eagan Co., Inc., Walter H., Philadelphia, Pa.
- Fairbanks, Morse & Co., Chicago, Ill.
- Guild & Garrison, Inc., Brooklyn, N. Y.
- Jackson Co., Byron, Los Angeles, Calif.
- Jacuzzi Bros., Inc., Richmond, Calif.
- Layne & Bowler, Inc., Memphis, Tenn.
- Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
- Oilux Co., Fort Wayne, Ind.
- Pacific Pumping Co., Oakland, Calif.
- Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
- Smith Corp., A. O., Milwaukee, Wis.
- Sta-Rite Products, Inc., Delavan, Wis.
- Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS, FIRE

- ● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
- American-Marsh Pumps, Inc., Battle Creek, Mich.
- Aurora Pump Co., Aurora, Ill.
- Barnes Manufacturing Co., Mansfield, O.
- Blackburn-Smith Mfg. Co., Hoboken, N. J.
- ● Buffalo Pumps, Inc., Buffalo, N. Y.
- ● Chicago Pump Co., Chicago, Ill.
- Cook, Inc., Lawrenceburg, Ind.
- Davidson Co., M. T., Brooklyn, N. Y.
- De Laval Steam Turbine Co., Trenton, N. J.
- ● Economy Pumps, Inc., Hamilton, O.
- Fairbanks, Morse & Co., Chicago, Ill.
- Frederick Iron & Steel Inc., Frederick, Md.
- Gorman-Rupp Co., Mansfield, O.
- Goulds Pumps, Inc., Seneca Falls, N. Y.
- Guild & Garrison, Inc., Brooklyn, N. Y.
- Ingersoll-Rand Co., New York, N. Y.
- Jackson Co., Byron, Los Angeles, Calif.
- Jacuzzi Bros., Inc., Richmond, Calif.
- Layne & Bowler, Inc., Memphis, Tenn.
- Lecourtenay Co., Newark, N. J.
- Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
- Morris Machine Wks., Baldwinsville, N. Y.
- Myers & Bro. Co., F. E., The, Ashland, O.
- Oberdorfer Foundries, Inc., Syracuse, N. Y.
- Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
- Viking Pump Co., Cedar Falls, Ia.
- Warren Steam Pump Co., Inc., Warren, Mass.
- Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS, HIGH PRESSURE, HYDRAULIC

- Aldrich Pump Co., Allentown, Pa.
- American Engineering Co., Philadelphia, Pa.
- Blackhawk Mfg. Co., Milwaukee, Wis.
- ● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
- Daigger & Co., A., Chicago, Ill.
- Davidson Co., M. T., Brooklyn, N. Y.
- De Laval Steam Turbine Co., Trenton, N. J.
- Dudgeon, Inc., Richard, New York, N. Y.
- Gorman-Rupp Co., Mansfield, O.
- Guild & Garrison, Inc., Brooklyn, N. Y.
- National Steam Pump Co., Upper Sandusky, O.
- Robbins & Myers, Inc., Springfield, O.
- Roper Corp., Geo. D., Rockford, Ill.
- Roy Co., Milton, Philadelphia, Pa.
- Sta-Rite Products, Inc., Delavan, Wis.
- Union Steam Pump Co., Battle Creek, Mich.
- Viking Pump Co., Cedar Falls, Ia.
- ● Watson-Stillman Co., Roselle, N. J.

PUMPS, LIQUID REFRIGERANT CIRCULATING

- Alliance Industries, Huntingden Valley, Pa.
- American-Marsh Pumps, Inc., Battle Creek, Mich.
- Aurora Pump Co., Aurora, Ill.
- Blackburn-Smith Mfg. Co., Hoboken, N. J.
- ● Chicago Pump Co., Chicago, Ill.
- ● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
- Davidson Co., M. T. Brooklyn, N. J.
- De Laval Steam Turbine Co., Trenton, N. J.
- ● Eagan Co., Inc., Walter H., Philadelphia, Pa.
- ● Economy Pumps, Inc., Hamilton, O.
- Fairbanks, Morse & Co., Chicago, Ill.
- ● Frick Co., Waynesboro, Pa.
- Goulds Pumps, Inc., Seneca Falls, N. Y.
- Guild & Garrison, Inc., Brooklyn, N. Y.
- Ingersoll-Rand Co., New York, N. Y.
- Jackson Co., Byron, Los Angeles, Calif.
- Lewis & Co., Chas. S., St. Louis, Mo.
- Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
- Pioneer Pump & Mfg. Co., Detroit, Mich.
- Roper Corp., Geo. D., Rockford, Ill.
- Roth Co., Roy E., Rock Island, Ill.
- Viking Pump Co., Cedar Falls, Ia.
- Vilter Mfg. Co., Milwaukee, Wis.
- Warren Steam Pump Co., Inc., Warren, Mass.
- Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS, PROPELLER

- American Well Works, Aurora, Ill.
- ● Economy Pumps, Inc., Hamilton, O.
- Frederick Iron & Steel Inc., Frederick, Md.

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Ingersoll-Rand Co., New York, N. Y.
Jackson Co., Byron, Los Angeles, Calif.
Oilux Co., Fort Wayne, Ind.
Pacific Pumping Co., Oakland, Calif.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Pioneer Pump & Mfg. Co., Detroit, Mich.
Tri-Clover Machine Co., Kenosha, Wis.
Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS, PROPORTIONING

Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Cochrane Corp., Philadelphia, Pa.
Dearborn Chemical Co., Chicago, Ill.
Jacuzzi Bros., Inc., Richmond, Calif.
Marco Co., Inc., Wilmington, Del.
Nelson Chemical Pumps, Casper, Wyo.
% Proportioneers, Inc. %, Providence, R. I.
Robbins & Myers, Inc., Springfield, O.
Roy Co., Milton, Philadelphia, Pa.
Wallace & Tiernan Co., Inc., Newark, N. J.

PUMPS, RECIPROCATING

Aldrich Pump Co., Allentown, Pa.
Altens Foundry & Machine Works, Inc., Lancaster, O.
American Hard Rubber Co., New York, N. Y. (Rubber and Rubber lined)
American-Marsh Pumps, Inc., Battle Creek, Mich.
Austin-Mason Co., Everett, Mass.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
● Buffalo Pumps, Inc., Buffalo, N. Y.
Caton Co., Newark, N. J.
Columbus Steam Pump Wks., Columbus, O.
● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Cook, Inc., A. D., Lawrenceburg, Ind.
Davidson Co., M. T., Brooklyn, N. Y.
Dean Brothers Pumps, Inc., Indianapolis, Ind.
Delco Appliance Div., General Motors Corp., Rochester, N. Y.
Deming Co., Salem, O.
Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., Pittsburgh, Pa.
Duro Co., Dayton,O.
● Eagan Co., Inc., Walter H., Philadelphia, Pa.
Everite Pump & Mfg. Co., Inc., Lancaster, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Gardner-Denver Co., Quincy, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Ingersoll-Rand Co., New York, N. Y.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Myers & Bro. Co., F. E., The, Ashland, O.
National Steam Pump Co., Upper Sandusky, O.
National Water Lift Inc., Kalamazoo, Mich.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Red Jacket Mfg. Co., Davenport, Ia.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Roy Co., Milton, Philadelphia, Pa.
Sta-Rite Products, Inc., Delavan, Wis.
Uniflow Mfg. Co., Erie, Pa.
Union Steam Pump Co., Battle Creek, Mich.
Warren Steam Pump Co., Inc., Warren, Mass.
● Watson-Stillman Co., Roselle, N. J.
Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS, ROTARY

Allen Billmyre Div., Lamson Corp., Syracuse, N. Y.
American Engineering Co., Philadelphia, Pa.
American Hard Rubber Co., New York, N. Y. (Rubber and rubber lined)
Beach-Russ Co., New York, N. Y.
Blackmer Pump Co., Grand Rapids, Mich.
Bowser, Inc., Fort Wayne, Ind.
Bump Pump Co., La Crosse, Wis.
Caton Co., Newark, N. J.
● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
De Laval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
● Eagan Co., Inc., Walter H., Philadelphia, Pa.
Eastern Industries, Inc., New Haven, Conn.
Fairbanks, Morse & Co., Chicago, Ill.
Foster Pump Wks., Inc., Brooklyn, N. Y.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Hypro Engineering Co., Minneapolis, Minn.
Jabsco Pump Co., Burbank, Calif.
Kinney Mfg. Co., Boston, Mass.
Kraissl Co., Inc., The, Hackensack, N. J.
Lammert & Mann Co., Chicago, Ill.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Marco Co., Inc., Wilmington, Del.
● Martocello & Co., Jos. A., Philadelphia, Pa.
May Oil Burner Div., Gerotor May Corp., Baltimore, Md.
Monarch Mfg. Wks., Inc., Philadelphia, Pa.
● Nash Engineering Co., South Norwalk, Conn.
Oberdorfer Foundries, Inc., Syracuse, N. Y.
Pioneer Pump & Mfg. Co., Detroit, Mich.
Polo Pump Co., Polo, Ill.
Quimby Pump Div., H. K. Porter Co., Inc., Pittsburgh, Pa.
Red Jacket Mfg. Co., Davenport, Ia.
Robbins & Myers, Inc., Springfield, O.
Roots-Connersville Blower Corp., Connersville, Ind.
Roper Corp., Geo. D., Rockford, Ill.
Roth Co., Roy E., Rock Island, Ill.
St. Louis Tool Co., St. Louis, Mo.
Schutte & Koerting Co., Philadelphia, Pa.
Scott-Newcomb, Inc., St. Louis, Mo.
Sundstrand Machine Tool Co., Hydraulic Div., Rockford, Ill. (for oil burners)
Taber Pump Co., Buffalo, N. Y.
Trimount Rotary Power Co., Dedham, Mass.
Tuthill Pump Co., Chicago, Ill.
Viking Pump Co., Cedar Falls, Ia.
Webster Electric Co., Racine, Wis.
Worthington Pump & Machinery Corp., Harrison, N. J.
Yale & Towne Mfg. Co., Stamford, Conn.

PUMPS, SEWAGE AND SLUDGE

American-Marsh Pumps, Inc., Battle Creek, Mich.
American Well Works, Aurora, Ill.
Aurora Pump Co., Aurora, Ill.
Barnes Manufacturing Co., Mansfield, O.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
● Buffalo Pumps, Inc., Buffalo, N. Y.
● Chicago Pump Co., Chicago, Ill.
● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
De Laval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
Domestic Engine & Pump Co., Shippensburg, Pa.
● Eagan Co., Inc., Walter H., Philadelphia, Pa.
● Economy Pumps, Inc., Hamilton, O.
Frederick Iron & Steel Inc., Frederick, Md.
Gorman-Rupp Co., Mansfield, O.
Guild & Garrison, Inc., Brooklyn, N. Y.
Ingersoll-Rand Co., New York, N. Y.
Jackson Co., Byron, Los Angeles, Calif.
Jacuzzi Bros. Inc., Richmond, Calif.
Kingsford Foundry & Machine Works, Oswego, N. Y.
Marlow Pumps, Ridgewood, N. J.
● Nash Engineering Co., South Norwalk, Conn.
Pacific Pumping Co., Oakland, Calif.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Quimby Pump Div., H. K. Porter Co., Inc., Pittsburgh, Pa.
Robbins & Myers, Inc., Springfield, O.
Swaby Mfg. Co., Chicago, Ill.
● Weil Pump Co., Chicago, Ill.
Weinman Pump Mfg. Co., The, Columbus, O.
● Whittington Pump & Engineering Corp. Indianapolis, Ind.
Worthington Pump & Machinery Corp., Harrison, N. J.
Yeomans Bros. Co., Chicago, Ill.

PUMPS, STEAM

American-Marsh Pumps, Inc., Battle Creek, Mich.
Austin-Mason Co., Everett, Mass.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Columbus Steam Pump Wks. Co., Columbus, O.
Davidson Co., M. T., Brooklyn, N. Y.
Dean Brothers Pumps, Inc., Indianapolis, Ind.
● Eagan Co., Inc., Walter H., Philadelphia, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Gardner-Denver Co., Quincy, Ill.
Guild & Garrison, Inc., Brooklyn, N. Y.
Jacuzzi Bros., Inc., Richmond, Calif.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
National Steam Pump Co., Upper Sandusky, O.
Union Steam Pump Co., Battle Creek, Mich.
Warren Steam Pump Co., Inc., Warren, Mass.
● Watson-Stillman Co., Roselle, N. J.
Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS, SUMP

● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Aurora Pump Co., Aurora, Ill.
Austin-Mason Co., Everett, Mass.
Barrett, Haentjens & Co., Hazleton, Pa.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
● Buffalo Pumps, Inc., Buffalo, N. Y.
Chicago Pneumatic Tool Co., New York, N. Y.
● Chicago Pump Co., Chicago, Ill.
Columbus Steam Pump Wks. Co., Columbus, O.
Cook, Inc., A. D., Lawrenceburg, Ind.
Davidson Co., M. T., Brooklyn, N. Y.
Dean Hill Pump Co., Indianapolis, Ind.
De Laval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
Domestic Engine & Pump Co., Shippensburg, Pa.
Duro Co., Dayton, O.
● Eagan Co., Inc., Walter H., Philadelphia, Pa.
Eastern Industries, Inc., New Haven, Conn.
● Economy Pumps, Inc., Hamilton, O.
Everite Pump & Mfg. Co., Inc., Lancaster, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Frederick Iron & Steel Inc., Frederick, Md.

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Gorman-Rupp Co., Mansfield, O.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
● Hoffman Specialty Co., Indianapolis, Ind.
Imperial Brass Mfg. Co., Chicago, Ill.
Independent Pneumatic Tool Co., Aurora, Ill.
Ingersoll-Rand Co., New York, N. Y.
Jabsco Pump Co., Burbank, Cailf.
Jackson Co., Byron, Los Angeles, Cailf.
Jacuzzi Bros., Inc., Richmond, Calif.
Kingsford Foundry & Machine Wks., Oswego, N. Y.
Kol-Master Corp., Oregon, Ill.
Lawrence Pump & Engine Co., Lawrence, Mass.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Morris Machine Wks., Baldwinsville, N. Y.
Myers & Bro. Co., F. E., The, Ashland, O.
Noera Mfg. Co., Div., Chase Brass & Copper Co., Waterbury, Conn.
Oilux Co., Fort Wayne, Ind.
Pacific Pumping Co., Oakland, Calif.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Penberthy Injector Co., Detroit, Mich.
Peters-Dalton, Inc., Detroit, Mich.
Piqua Machine & Mfg. Co., Piqua, O.
Quimby Pump Div., H. K. Porter Co., Inc., Pittsburgh, Pa.
Red Jacket Mfg. Co., Davenport, Ia.
Robbins & Myers, Inc., Springfield, O.
Roth Co., Roy E., Rock Island, Ill.
Schneible Co., Claude B., Detroit, Mich.
Schutte & Koerting Co., Philadelphia, Pa.
Standard Electric Mfg. Co., West Berlin, N. J.
Sta-Rite Products, Inc., Delavan, Wis.
Swaby Mfg. Co., Chicago, Ill.
Taber Pump Co., Buffalo, N. Y.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Uniflow Mfg. Co., Erie, Pa.
Union Steam Pump Co., Battle Creek, Mich.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Wade Mfg. Co., Elgin, Ill.
Warren Steam Pump Co., Inc., Warren, Mass.
● Weil Pump Co., Chicago, Ill.
Weinman Pump Mfg. Co., The, Columbus, O.
Worthington Pump & Machinery Corp., Harrison, N. J.
Yeomans Bros. Co., Chicago, Ill.

PUMPS, VACUUM

Allen Billmyre Div., Lamson Corp., Syracuse, N. Y.
● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Aminco Refrigeration Products Co., Detroit, Mich.
Austin-Mason Co., Everett, Mass.
Barrett, Haentjens & Co., Hazleton, Pa.
Beach-Russ Co., New York, N. Y.
Bury Compressor Co., Erie, Pa.
Chicago Pneumatic Tool Co., New York, N. Y.
● Chicago Pump Co., Chicago, Ill.
● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Daigger & Co., A., Chicago, Ill.
Davidson Co., M. T., Brooklyn, N. Y.
Dean Brothers Pumps, Inc., Indianapolis, Ind.
De Laval Steam Turbine Co., Trenton, N. J.
Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., Pittsburgh, Pa.
● Dunham Co., C. A., Chicago, Ill.
● Eagan Co., Inc., Walter H., Philadelphia, Pa.
● Economy Pumps, Inc., Hamilton, O.
Eisler Engineering Co., Inc., Newark, N. J.
Electric Sprayit Co., The, Sheboygan, Wis.
Foster Pump Wks., Inc., Brooklyn, N. Y.
● Foster Wheeler Corp., New York, N. Y.
Fuller Co., Catasauqua, Pa.
Gardner-Denver Co., Quincy, Ill.
General Ceramics & Steatite Corp., Keasbey, N. J. (Chemical stoneware)
Guild & Garrison, Inc., Brooklyn, N. Y.
Ingersoll-Rand Co., New York, N. Y.
Kinney Mfg. Co., Boston, Mass.
Kraissl Co., Inc., The, Hackensack, N. J.
Lammert & Mann Co., Chicago, Ill.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
● Nash Engineering Co., South Norwalk, Conn.
National Steam Pump Co., Upper Sandusky, O.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Pioneer Pump & Mfg. Co., Detroit, Mich.
Roots-Connersville Blower Corp., Connersville, Ind.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
● Skidmore Corp., St. Joseph, Mich.
Stokes Machine Co., F. J., Philadelphia, Pa.
Trimount Rotary Power Co., Dedham, Mass.
Viking Pump Co., Cedar Falls, Ia.
● Wheeler Mfg. Co., C. H., Philadelphia, Pa.
● Whittington Pump & Engineering Corp. Indianapolis, Ind.
Worthington Pump & Machinery Corp., Harrison, N. J.
Yeomans Bros. Co., Chicago, Ill.

PUMPS, VACUUM HEATING

American Hydrovac, Inc., Brooklyn, N. Y.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Chicago Pump Co., Chicago, Ill.
Columbus Steam Pump Wks. Co., Columbus, O.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Domestic Engine & Pump Co., Shippensburg, Pa.
● Dunham Co., C. A., Chicago, Ill.
● Eagan Co., Inc., Walter H., Philadelphia, Pa.
● Economy Pumps, Inc., Hamilton, O.
Faber Engineering Co., Inc., Philadelphia, Pa.
Gardner-Denver Co., Quincy, Ill.
Guild & Garrison, Inc., Brooklyn, N. Y.
● Hoffman Specialty Co., Indianapolis, Ind.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
● Nash Engineering Co., South Norwalk, Conn.
Roots-Connersville Blower Corp., Connersville, Ind.
● Skidmore Corp., St. Joseph, Mich.
● Sterling, Inc., Milwaukee, Wis.
Union Steam Pump Co., Battle Creek, Mich.
Warren Steam Pump Co., Inc., Warren, Mass.
● Whittington Pump & Engineering Corp. Indianapolis, Ind.
Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS, VISCOUS LIQUIDS AND HEAVY MATERIALS

Aldrich Pump Co., Allentown, Pa.
● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Austin-Mason Co., Everett, Mass.
Beach-Russ Co., New York, N. Y.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Blackmer Pump Co., Grand Rapids, Mich.
● Buffalo Pumps, Inc., Buffalo, N. Y.
Bump Pump Co., La Crosse, Wis.
● Chicago Pump Co., Chicago, Ill.
Columbus Steam Pump Wks. Co., Columbus, O.
● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Davidson Co., M. T., Brooklyn, N. Y.
Dean Brothers Pumps, Inc., Indianapolis, Ind.
De Laval Steam Turbine Co., Trenton, N. J.
● Eagan Co., Inc., Walter H., Philadelphia, Pa.
● Economy Pumps, Inc., Hamilton, O.
Engineer Co., New York, N. Y.
Fairbanks, Morse & Co., Chicago, Ill.
Foster Pump Wks., Inc., Brooklyn, N. Y.
Frederick Iron & Steel Inc., Frederick, Md.
Gardner-Denver Co., Quincy, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
Ingersoll-Rand Co., New York, N. Y.
Jabsco Pump Co., Burbank, Cailf.
Jackson Co., Byron, Los Angeles, Calif.
Jacuzzi Bros., Inc., Richmond, Calif.
Kingsford Foundry & Machine Wks., Oswego, N. Y.
Kinney Mfg. Co., Boston, Mass.
Kraissl Co., Inc., The, Hackensack, N. J.
Lawrence Pump & Engine Co., Lawrence, Mass.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Marco Co., Inc., Wilmington, Del.
Morris Machine Wks., Baldwinsville, N. Y.
Peerless Pump Div., Food Machinery and Chemical Corp., Los Angeles, Calif.
Quimby Pump Div., H.K. Porter Co., Inc., Pittsburgh, Pa.
Red Jacket Mfg. Co., Davenport, Ia.
Robbins & Myers, Inc., Springfield, O.
Roots-Connersville Blower Corp., Connersville, Ind.
Roper Corp., Geo. D., Rockford, Ill.
Roy Co., Milton, Philadelphia, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Taber Pump Co., Buffalo, N. Y.
Tuthill Pump Co., Chicago, Ill.
Union Steam Pump Co., Battle Creek, Mich.
Viking Pump Co., Cedar Falls, Ia.
Warren Steam Pump Co., Inc., Warren, Mass.
● Whittington Pump & Engineering Corp. Indianapolis, Ind.
Worthington Pump & Machinery Corp., Harrison, N. J.
Yeomans Bros. Co., Chicago, Ill.

PUNCHES, SHEET METAL

Bertsch & Co., Inc., Cambridge City, Ind.
Blackhawk Mfg. Co., Milwaukee, Wis.
Bliss Co., E. W., Detroit, Mich.
Callahan Can Machine Co., Inc., Brooklyn, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Cleveland Punch & Shear Wks. Co., Cleveland, O.
Excelsior Tool & Machine Co., East St. Louis, Ill.
● Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill.
Heartley Machine & Tool Co., Toledo, O.
Hendley & Whittemore Co., Beloit, Wis.
Henry & Wright, Div. of Hartford-Empire Co., Hartford, Conn.
International Nutyp Tool Co., Oswego, N. Y.
Kidder Mfg. Co., Inc., J. F., Burlington, Vt.
M-M-A, Inc., Lancaster, Pa.
New Albany Machine Mfg. Co., New Albany, Ind.
Niagara Machine & Tool Wks., Buffalo, N. Y.
O'Neil Irwin Mfg. Co., Lake City, Minn.
Parker-Kalon Corp., New York, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Perkins Machine Co., Warren, Mass.

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Reiner & Campbell Co., Inc., Elizabeth, N. J.
Swaine Mfg. Co., Fred J., St. Louis, Mo.
Whitney Mfg. Co., W. A., Rockford, Ill.
Whitney Metal Tool Co., Rockford, Ill.
Wiedemann Machine Co., Philadelphia, Pa.
Zeb & Hahnemann Co., Newark, N. J.

PURGERS, REFRIGERANT GAS

● **Armstrong Machine Works, Three Rivers, Mich.**
● **Frick Co., Waynesboro, Pa.**
Mueller Brass Co., Port Huron, Mich.
Vilter Mfg. Co., Milwaukee, Wis.
● York Corp., York, Pa.

PUSHERS, PIPE, HYDRAULIC

Blackhawk Mfg. Co., Milwaukee, Wis.
Dudgeon, Inc., Richard, New York, N. Y.
● Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill.

RADIANT HEATING COILS

See Coils and Panels, Radiant Heating, Prefabricated

RADIATION, BASEBOARD, FERROUS

● **American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.**
● Auto Radiator Specialty Co., Chicago, Ill.
Burnham Corp., Boiler Div., Irvington, N. Y.
● **Crane Co., Chicago, Ill.**
● **Dunham Co., C. A., Chicago, Ill.**
● Kritzer Radiant Coils, Inc., Chicago, Ill.
● **Rempe Co., Chicago, Ill.**
● Rittling Corp., The, Buffalo, N. Y.
Smith Co., Inc., H. B., The, Westfield, Mass.
Sterling Radiator Co., Inc., Westfield, Mass.
United States Radiator Corp., Detroit, Mich.
Utica Radiator Corp., Utica, N. Y.
● Vulcan Radiator Co., Hartford, Conn.

RADIATION, BASEBOARD, NON-FERROUS

Airecon Industries, Detroit, Mich.
Brown Products Co., New York, N. Y.
● G & O Mfg. Co., New Haven, Conn.
● General Oil Burner Corp., Baltimore, Md.
Huron Boiler Co., Detroit, Mich.
● Kritzer Radiant Coils, Inc., Chicago, Ill.
Minimite Co., Chicago, Ill.
National Radiator Co., The, Johnstown, Pa.
● **Rittling Corp., Buffalo, N. Y.**
● Vulcan Radiator Co., Hartford, Conn.
● **Webster & Co., Warren, Camden, N. J.**

RADIANT HEAT THERMOSTATS

See Thermostats, Radiant Heat

RADIANT HEATING ELECTRICAL CONDUCTORS

See Conductors, Electrical, for Radiant Heating

RADIATION, CONVECTION TYPE, FERROUS

● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
● Auto Radiator Specialty Co., Chicago, Ill.
Brown Fintube Co., The, Elyria, O.
● Kritzer Radiant Coils, Inc., Chicago, Ill.
● **Murray Mfg. Co., D. J., Wausau, Wis.**
National Radiator Co., The, Johnstown, Pa.
● Rempe Co., Chicago, Ill.
● **Rittling Corp., The, Buffalo, N. Y.**
Stedco Products, Kingston, Pa.
Tenney Engineering Inc., Newark, N. J.
United States Radiator Corp., Detroit, Mich.
Weil-McLain Co., Chicago, Ill.

RADIATION, CONVECTION TYPE, NON-FERROUS

Airecon Industries, Detroit, Mich.
Airtherm Mfg. Co., St. Louis, Mo.
American Coils Co., Newark, N. J.
● **American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.**
Beacon-Morris Corp., Boston, Mass.
Brown Fintube Co., The, Elyria, O.
● **Bush Mfg. Co., West Hartford, Conn.**
● **Dunham Co., C. A., Chicago, Ill.**
● **Fedders-Quigan Corp., Buffalo, N. Y.**
● **G. & O. Mfg. Co., New Haven, Conn.**
Kehm Corp., The, Chicago, Ill.
Kramer Trenton Co., Trenton, N. J.
● Kritzer Radiant Coils, Inc., Chicago, Ill.
Minimite Co., Chicago, Ill.
● **Modine Mfg. Co., Racine, Wis.**
National Radiator Co., The, Johnstown, Pa.
● **Nesbitt Inc., John J., Philadelphia, Pa.**

Refrigeration Economics Co., Inc., Canton, O.
● **Rittling Corp., The, Buffalo, N. Y.**
Rome-Turney Radiator Co., Rome, N. Y.
Shaw-Perkins Mfg. Co., Pittsburgh, Pa.
Tenney Engineering Inc., Newark, N. J.
● **Trane Co., The, La Crosse, Wis.**
● **Tuttle & Bailey, Inc., New Britain, Conn.**
United States Radiator Corp., Detroit, Mich.
Universal Convector Corp., New York, N. Y.
Vapor Heating Corp., Chicago, Ill.
● **Webster & Co., Warren, Camden, N. J.**
● **Young Radiator Co., Racine, Wis.**
Yula Water Heaters Inc., New York, N. Y.

RADIATION, DIRECT

● **American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.**
Burnham Corp., Boiler Div., Irvington, N. Y.
Clifford Mfg. Co., Div. of Standard-Thomson Corp., Waltham, Mass (For aircraft)
Clow & Sons, James B., Chicago, Ill. (Gas fired)
Columbia Radiator Co., McKeesport, Pa.
● **Crane Co., Chicago, Ill.**
Dunkirk Radiator Corp., Dunkirk, N. Y.
● **Murray Mfg. Co., D. J., Wausau, Wis.**
National Radiator Co., The, Johnstown, Pa.
● **Rittling Corp., The, Buffalo, N. Y.**
United States Radiator Corp., Detroit, Mich.
Utica Radiator Corp., Utica, N. Y.
Weil-McLain Co., Michigan City, Ind.
Wilson Engineering Corp., Chicago, Ill.

RADIATION, FIN TUBE TYPE

Airecon Industries, Detroit, Mich.
American Coils Co., Newark, N. J.
Auburn Burner Co., Auburn, Ind.
● Auto Radiator Specialty Co., Chicago, Ill.
Brown Products Co., Forest Hills, N. Y.
● Doyle & Roth Mfg. Co., Brooklyn, N. Y.
● Fedders-Quigan Corp., Buffalo, N. Y.
● G & O Mfg. Co., New Haven, Conn.
Kramer Trenton Co., Trenton, N. J.
● Kritzer Radiant Coils, Inc., Chicago, Ill.
Minimite Co., Chicago, Ill.
National Radiator Co., The, Johnstown, Pa.
Refrigeration Economics Co., Inc., Canton, O.
● **Rempe Co., Chicago, Ill.**
● Rittling Corp., The, Buffalo, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
Shaw-Perkins Mfg. Co., Pittsburgh, Pa.
Smith Co., Inc., H. B., The, Westfield, Mass.
Sterling Radiator Co., Inc., Westfield, Mass.
● Super Radiator Corp., Minneapolis, Minn.
Tenney Engineering Inc., Newark, N. J.
● **Tilco-Fin-Tubing Div., David E. Kennedy, Inc., Brooklyn, N. Y.**
● **Trane Co., The, La Crosse, Wis.**
United States Radiator Corp., Detroit, Mich.
Vapor Heating Corp., Chicago, Ill.
● **Vulcan Radiator Co., Hartford, Conn.**

RADIATOR AND CONVECTOR HUMIDIFIERS

See Humidifiers for Radiators and Convectors

RADIATOR HANGERS

See Hangers or Brackets, Radiator

RADIATOR ORIFICES

See Orifices, Radiator

RADIATOR ORIFICE VALVES

See Valves, Radiator, Orifice

RADIATOR VALVES

See Valves, Radiator

RADIATOR VENT VALVE HUMIDIFIERS

See Humidifiers, Radiator Vent Valve

RADIATORS, ELECTRIC

Acrow, Inc., Newark, N. J.
Burnham Corp., Boiler Div., Irvington, N. Y.
Conco Engineering Wks., Div. of H. D. Conkey & Co., Mendota, Ill.
Meco, Inc, Portland, Ore.

RADIATORS, GAS FIRED

Brown Fintube Co., The, Elyria, O.
Clow & Sons, James B., Chicago, Ill.

RADIATORS, HUMIDIFYING

● **Murray Mfg. Co., D. J., Wausau, Wis.**

RATCHET WRENCHES

See Wrenches, Ratchet

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REAMERS, PIPE

American Pipe Tool Co., Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Armstrong Mfg. Co., Bridgeport, Conn.
Beaver Pipe Tools, Inc., Warren, O.
Crown Die & Tool Co., Chicago, Ill.
Greenfield Tap & Die Corp., Greenfield, Mass.
Independent Pneumatic Tool Co., Aurora, Ill.
Mueller Co., Decatur, Ill.
Nye Tool Co., Chicago, Ill.
Sac Tool Mfg. Co., St. Louis, Mo.
Toledo Pipe Threading Machine Co., Toledo, O.

RECIPROCATING PUMPS

See Pumps, Reciprocating

RECORDER-CONTROLLERS, COMBINED TEMPERATURE AND HUMIDITY

American Instrument Co., Silver Spring, Md.
Bristol Co., The, Waterbury, Conn.
Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Ess Instrument Co., Bergenfield, N. J.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Gotham Instrument Co., Inc., New York, N. Y.
Leeds & Northrup Co., Philadelphia, Pa.
● Powers Regulator Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Corp., C. J., Newark, N. J.
● Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.

RECORDER-CONTROLLERS, HUMIDITY

American Instrument Co., Silver Spring, Md.
Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Gotham Instrument Co., Inc., New York, N. Y.
● Johnson Service Co., Milwaukee, Wis.
Leeds & Northrup Co., Philadelphia, Pa.
● Powers Regulator Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Corp., C. J., Newark, N. J.
● Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.

RECORDER-CONTROLLERS, PRESSURE

Bailey Meter Co., Cleveland, O.
Baldwin Locomotive Wks., Eddystone Div., Eddystone, Pa.
Bristol Co., The, Waterbury, Conn.
Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Defender Instrument and Regulator Co., St. Louis, Mo.
Foxboro Co., Foxboro, Mass.
Gotham Instrument Co., Inc., New York, N. Y.
● Hays Corp., Michigan City, Ind.
Mason-Neilan Regulator Co., Boston, Mass.
Moore Products Co., Philadelphia, Pa.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Scientific Instrument Co., Detroit, Mich.
Shallcross Controls, Inc., Milwaukee, Wis.
Tagliabue Corp., C. J., Newark, N. J.
● Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.

RECORDER-CONTROLLERS, TEMPERATURE

American Instrument Co., Silver Spring, Md.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Defender Instrument and Regulator Co., St. Louis, Mo.
Foxboro Co., Foxboro, Mass.
Gotham Instrument Co., Inc., New York, N. Y.
● Johnson Service Co., Milwaukee, Wis.
Leeds & Northrup Co., Philadelphia, Pa.
Mason-Neilan Regulator Co., Boston, Mass.
Moore Products Co., Philadelphia, Pa.
Penn Industrial Instrument Corp., Philadelphia, Pa.
● Powers Regulator Co., Chicago, Ill.
Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.
Scientific Instrument Co., Detroit, Mich.
Shallcross Controls, Inc., Milwaukee, Wis.
Tagliabue Corp., C. J., Newark, N. J.
● Taylor Instrument Companies, Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
Wheelco Instruments Co., Chicago, Ill.

RECORDERS, CARBON DIOXIDE

Cole-Sewell Engineering Co., St. Paul, Minn.
Davis Emergency Equipment Co., Newark, N. J.
Defender Instrument and Regulator Co., St. Louis, Mo.
Engelhard, Inc., Charles, Newark, N. J.
Foxboro Co., Foxboro, Mass.
● Hays Corp., Michigan City, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia, Pa.
Permutit Co., New York, N. Y.
Republic Flow Meters Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.

RECORDERS, COMBINED TEMPERATURE AND HUMIDITY

American Instrument Co., Silver Spring, Md.
Bristol Co., The, Waterbury, Conn.
Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Gotham Instrument Co., Inc., New York, N. Y.
Moeller Instrument Co., Richmond Hill, N. Y.
● Powers Regulator Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Corp., C. J., Newark, N. J.
● Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Weksler Thermometer Corp., New York, N. Y.

RECORDERS, DEW POINT

Foxboro Co., Foxboro, Mass.
● Surface Combustion Corp., Toledo, O.
Wallace & Tiernan Co, Inc., Newark, N. J.

RECORDERS, DRAFT

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Defender Instrument and Regulator Co., St. Louis, Mo.
Foxboro Co., Foxboro, Mass.
● Hays Corp., Michigan City, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.

RECORDERS, HUMIDITY

American Instrument Co., Silver Spring, Md.
Bristol Co., The, Waterbury, Conn.
Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Garden City Instruments, Inc., Chicago, Ill.
Leeds & Northrup Co., Philadelphia, Pa.
Moeller Instrument Co., Richmond Hill, N. Y.
● Powers Regulator Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Corp., C. J., Newark, N. J.
● Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Weksler Thermometer Corp., New York, N. Y.

RECORDERS, LIQUID LEVEL

Bailey Meter Co., Cleveland, O.
Barton Instrument Co., Los Angeles, Calif.
Bristol Co., The, Waterbury, Conn.
Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Defender Instrument & Regulator Co., St. Louis, Mo.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
● Hays Corp., Michigan City, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Liquidometer Corp., Long Island City, N. Y.
Mason-Neilan Regulator Co., Boston, Mass.
Moore Products Co., Philadelphia, Pa.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
● Taylor Instrument Companies, Rochester, N. Y.
Uehling Instrument Co., Paterson, N. J.
● Westinghouse Electric Corp., Pittsburgh, Pa.
● Yarnall-Waring Co., Philadelphia, Pa.

RECORDERS, OXYGEN

Bailey Meter Co., Cleveland, O.
● Hays Corp., Michigan City, Ind.
Mine Safety Appliances Co., Pittsburgh, Pa.

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RECORDERS, PRESSURE AND VACUUM

- **Bacharach Industrial Instrument Co., Pittsburgh, Pa.**
- **Bailey Meter Co., Cleveland, O.**
- **Baldwin Locomotive Wks., Eddystone Div., Eddystone, Pa.**
- **Bristol Co., The, Waterbury, Conn.**
- Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
- **Defender Instrument and Regulator Co., St. Louis, Mo.**
- **Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.**
- Electro Products Laboratories, Inc., Chicago, Ill.
- **Foxboro Co., Foxboro, Mass.**
- **Garden City Instruments, Inc., Chicago, Ill.**
- **Giannini & Co., Inc., Pasadena, Calif.**
- **Gotham Instrument Co., Inc., New York, N. Y.**
- ● **Hays Corp., Michigan City, Ind.**
- Leeds & Northrup Co., Philadelphia, Pa.
- **Manning, Maxwell & Moore, Inc., Bridgeport, Conn.**
- **Mason-Neilan Regulator Co., Boston, Mass.**
- **Moeller Instrument Co., Richmond Hill, N. Y.**
- **Penn Industrial Instrument Corp., Philadelphia, Pa.**
- **Republic Flow Meters Co., Chicago, Ill.**
- **Scientific Instrument Co., Detroit, Mich.**
- **Stokes Machine Co., F. J., Philadelphia, Pa.**
- **Tagliabue Corp., C. J., Newark, N. J.**
- ● Taylor Instrument Companies, Rochester, N. Y.
- **Trerice Co., H. O., Detroit, Mich.**
- **Uehling Instrument Co., Paterson, N. J.**
- **Weksler Thermometer Corp., New York, N. Y.**

RECORDERS, SMOKE DENSITY

- **Bailey Meter Co., Cleveland, O.**
- Boiler Room Equipment, Inc., New York, N. Y.
- **Ess Specialty Corp., Bergenfield, N. J.**
- Furst Electronics, Chicago, Ill.
- General Power Plant Corp., New York, N. Y.
- Photoswitch, Inc., Cambridge, Mass.

RECORDERS, TEMPERATURE

- **American Instrument Co., Silver Spring, Md.**
- ● Armstrong Machine Wks., Three Rivers, Mich.
- **Bacharach Industrial Instrument Co., Pittsburgh, Pa.**
- **Bailey Meter Co., Cleveland, O.**
- **Bristol Co., The, Waterbury, Conn.**
- Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
- ● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
- **Defender Instrument and Regulator Co., St. Louis, Mo.**
- **Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.**
- **Engelhard, Inc., Charles, Newark, N. J.**
- **Foxboro Co., Foxboro, Mass.**
- **Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.**
- **Garden City Instruments, Inc., Chicago, Ill.**
- **Gotham Instrument Co., Philadelphia, Pa.**
- **H-B Instrument Co., Philadelphia, Pa.**
- ● **Hays Corp., Michigan City, Ind.**
- **Manning, Maxwell & Moore, Inc., Bridgeport, Conn.**
- **Marsh Corp., Jas. P., Skokie, Ill.**
- **Mason-Neilan Regulator Co., Boston, Mass.**
- **Moeller Instrument Co., Richmond Hill, N. Y.**
- **Moore Products Co., Philadelphia, Pa.**
- Palmer Thermometers, Inc., Cincinnati (Norwood), O. (Mercury-actuated)
- **Penn Industrial Instrument Corp., Philadelphia, Pa.**
- ● **Powers Regulator Co., Chicago, Ill.**
- **Precision Scientific Co., Chicago, Ill.**
- **Preferred Utilities Mfg. Corp., New York, N. Y.**
- **Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.**
- **Republic Flow Meters Co., Chicago, Ill.**
- **Scientific Instrument Co., Detroit, Mich.**
- **Standard Thermometer, Inc., Boston, Mass.**
- **Tagliabue Corp., C. J., Newark, N. J.**
- ● Taylor Instrument Companies, Rochester, N. Y.
- **Thwing-Albert Instrument Co., Philadelphia, Pa.**
- **Trerice Co., H. O., Detroit, Mich.**
- **Weksler Thermometer Corp., New York, N. Y.**
- **Wheelco Instruments Co., Chicago, Ill.**

RECORDING THERMOMETERS

See Recorders, Temperature

RECOVERY EQUIPMENT, AIR

See Adsorbers, Odor

REDUCERS, SPEED

- ● **Allis-Chalmers Mfg. Co., Milwaukee, Wis.**
- **American Pulley Co., Philadelphia, Pa.**
- **Bodine Electric Co., Chicago, Ill.**
- **Boston Gear Wks., Inc., North Quincy, Mass.**
- Brown-Brockmeyer Co., Inc., Dayton, O.
- **De Laval Steam Turbine Co., Trenton, N. J.**
- **Doall Co., The, Des Plaines, Ill.**
- **Falk Corp., Milwaukee, Wis.**
- **General Electric Co., Apparatus Dept., Schenectady, N. Y.**
- **Graham Transmissions, Inc., Milwaukee, Wis.**
- **Janette Mfg. Co., Chicago, Ill.**
- **Jones Foundry & Machine Co., W. A., Chicago, Ill.**
- **Lima Electric Motor Co., Lima, O.**
- **Link Belt Co., Philadelphia, Pa.**
- **Medart Co., St. Louis, Mo.**
- **Philadelphia Gear Works, Inc., Philadelphia, Pa.**
- **Poole Foundry & Machine Co., Baltimore, Md.**
- **Reliance Electric & Engineering Co., Cleveland, O.**
- **Shallcross Controls, Inc., Milwaukee, Wis.**
- **Smith Corp., Winfield H., Springville, N. Y.**
- **Star Electric Motor Co., Bloomfield, N. J.**
- **Steam Turbine Div., Worthington Pump & Machinery Corp., Wellsville, N. Y.**
- ● **Stephens-Adamson Mfg. Co., Aurora, Ill.**
- **Sterling Electric Motors, Inc., Los Angeles, Calif.**
- **U. S. Electrical Motors, Inc., Los Angeles, Calif.**
- ● Westinghouse Electric Corp., Pittsburgh, Pa.

REFRACTORIES AND REFRACTORY CEMENT

- Allen Co., Robert G., Mechanicsville, N. Y.
- ● Armstrong Cork Co., Lancaster, Pa.
- **Babcock & Wilcox Co., New York, N. Y.**
- **Basic Refractories, Inc., Cleveland, O.**
- **Bird-Archer Co., Philadelphia, Pa.**
- **Botfield Refractories Co., Philadelphia, Pa.**
- Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
- **Chicago Fire Brick Co., Chicago, Ill.**
- **Ehret Magnesia Mfg. Co., Valley Forge, Pa.**
- **Fireline Stove & Furnace Lining Co., Chicago, Ill.**
- **General Insulating Products Co., Brooklyn, N. Y.**
- Green Fire Brick Co., Mexico, Mo.
- Johns-Manville, New York, N. Y.
- **Kellogg Co., M. W., The, New York, N. Y.**
- **Krehbiel Co., J. H., Chicago, Ill.**
- Laclede-Christy Co., St. Louis, Mo.
- **McLeod & Henry Co., Inc., Troy, N. Y.**
- Monogram Products Co., Philadelphia, Pa.
- **Munn and Steele, Inc., Newark, N. J.**
- **Plibrico Jointless Firebrick Co., Chicago, Ill.**
- **Preferred Utilities Mfg. Corp., New York, N. Y.**
- **Pyrolite Products Co., Cleveland, O.**
- **Quigley Co., Inc., New York, N. Y.**
- **Ramtite Co., The, Chicago, Ill.**
- **Refractory & Insulation Corp., New York, N. Y.**
- **Rex Clay Products Co., Detroit, Mich.**
- **Rutland Fire Clay Co., Rutland, Vt.**
- **S.O.S. Products Co., Inc., Brooklyn, N. Y.**
- **Saverite Engineering Co., Hoboken, N. J.**
- **Standard Fuel Engineering Co., Detroit, Mich.**
- **Taylor Sons Co., Charles, Cincinnati, O.**
- **United States Stoneware Co., New York, N. Y.**
- **Walsh Refractories Corp., St. Louis, Mo.**
- ● **Zonolite Co., Chicago, Ill.**

REFRIGERANT DEHYDRATORS

See Dehydrators, Refrigerant

REFRIGERANT FILTERS

See Filters, Refrigerant

REFRIGERANT GAS PURGERS

See Purgers, Refrigerant Gas

REFRIGERANTS

- **Ansul Chemical Co., Refrigeration Div. Marinette, Wis. (methyl chloride, sulphur dioxide)**
- **Armour Ammonia Wks., Chicago, Ill. (ammonia)**
- **Dow Chemical Co., The, Midland, Mich.**
- **du Pont de Nemours & Co., Inc., E. I. Polychemicals Dept., Wilmington, Del. (cylinder anhydrous ammonia, methyl chloride, sulphur dioxide, "Freon" refrigerants)**
- **du Pont de Nemours & Co., Inc., E. I., Electrochemicals Dept., Wilmington, Del. (Methyl chloride and methylene chloride)**
- **Kinetic Chemicals, Inc., Wilmington, Del. ("Freon" fluorinated hydrocarbon refrigerants)**
- **Liquid Carbonic Corp., Chicago, Ill. (carbon dioxide)**
- **Monsanto Chemical Co., Merimac Div., Boston, Mass. (anhydrous ammonia)**
- **Pennsylvania Salt Mfg. Co., Philadelphia, Pa. (ammonia)**
- **Pure Carbonic, Inc., New York, N. Y. (carbon dioxide)**
- Solvay Sales Div., Allied Chemical & Dye Corp., New York, N. Y.
- **Virginia Smelting Co., West Norfolk, Va., (Methyl chloride, liquid sulphur dioxide, methylene chloride)**

REFRIGERATING COMPRESSORS

See Compressors, Refrigerating

REFRIGERATION ACCUMULATORS

See Accumulators, Refrigeration

REFRIGERATION CONTROLS

See Valves, Refrigeration

REFRIGERATION FITTINGS

See Fittings, Refrigeration

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REFRIGERATION MANIFOLDS

See Manifolds, Refrigeration

REFRIGERATION VALVES

See Valves, Refrigeration

REGISTERS

See also Diffusers; Grilles; Panels, Perforated, for Air Diffusion

A. & A. Register Co., Cleveland, O.
● A-J Mfg. Co., Kansas City, Mo.
Acme Mfg. Co., Philadelphia, Pa.
Air Control Products, Inc., Coopersville, Mich.
● Auer Register Co., Cleveland, O.
Barber-Colman Co., Rockford, Ill.
Best Register Co., Milwaukee, Wis.
Char-Gale Mfg. Co., Minneapolis, Minn.
Controlair Mfg. Co., Los Angeles, Calif.
Diamond Mfg. Co., Wyoming, Pa.
● Dole Valve Co., The, Chicago, Ill. (Thermostatic air control)
Eaglesfield Ventilator Co., Indianapolis, Ind. (wood)
Empire Ventilation Equipment Co., Long Island City, N. Y.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Harrington & King Perforating Co., Chicago, Ill.
Hart & Cooley Mfg. Co., Holland, Mich.
Hendrick Mfg. Co., Carbondale, Pa.
● Independent Register Co., Cleveland, O.
Knowles Mushroom Ventilator Co., Upper Montclair, N. J.
Midco Register Corp., St. Paul, Minn.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
● Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Rock Island Register Co., Rock Island, Ill.
Smith Co., J. B., Philadelphia, Pa.
● Standard Stamping & Perforating Co., Chicago, Ill
Stewart Mfg. Co., Inc., Bloomfield, N. J.
● Titus Mfg. Corp., Waterloo, Ia.
Turnbull Mfg. & Dist. Co., Detroit, Mich.
● Tuttle & Bailey, Inc., New Britain, Conn.
United States Register Co., Battle Creek, Mich.
Viking Mfg. Corp., Cleveland, O.
Young Regulator Co., Cleveland, O.

REGISTER UNITS, FOR SECONDARY AIR SUPPLY FOR OIL BURNERS

Barber-Colman Co., Rockford, Ill.
Faber Engineering Co., Inc., Philadelphia, Pa.

REGULATORS, AIR VELOCITY

Barber-Colman Co., Rockford, Ill.
● Hays Corp., Michigan City, Ind.
● Johnson Service Co., Milwaukee, Wis.
● Powers Regulator Co., Chicago, Ill.
Shallcross Controls, Inc., Milwaukee, Wis.
● Taylor Instrument Companies, Rochester, N. Y.

REGULATORS, DAMPER SETS

Acme Mfg. Co., Philadelphia, Pa.
Adams Co., The, Dubuque, Ia.
Air Control Products, Inc., Coopersville, Mich.
● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Automatic Products Co., Milwaukee, Wis.
Barber-Colman Co., Rockford, Ill.
Cole-Sewell Engineering Co., St. Paul, Minn.
Crise Mfg. Co., The, Columbus, O.
Crown Controls Co., Inc., New Bremen, O.
● Detroit Lubricator Co., Detroit, Mich.
Field Control Div., H. D. Conkey & Co., Mendota, Ill.
Fossum, M. H., St. Paul, Minn.
Gerett Corp., M. A., Milwaukee, Wis.
Goese Mfg. Co., Milwaukee, Wis.
Hart & Cooley Mfg. Co., Holland, Mich.
Kerentoff, G. L., Cincinnati, O.
● Mercoid Corp., The, Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Ohio Products Co., Cleveland, O.
Parker-Kalon Corp., New York, N. Y.
Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Sampsel Time Control, Inc., Spring Valley, Ill.
● Sarcotherm Controls, Inc., New York, N. Y.
Shallcross Controls, Inc., Milwaukee, Wis.
● Trane Co., The, LaCrosse, Wis.
United States Register Co., Battle Creek, Mich.
● White-Rodgers Electric Co., St. Louis, Mo.
Young Regulator Co., Cleveland, O.

REGULATORS, DRAFT, COMBUSTION

Askania Regulator Co., Chicago, Ill.
Atlas Utilities Co., Providence, R. I.
Bailey Meter Co., Cleveland, O.
Boiler Room Equipment, Inc., New York, N. Y.
Bristol Co., The, Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Campbell Engineering Co., Appleton, Wis.
● Cash Co., A. W., Decatur, Ill.
Cleveland Fuel Equipment Co., Cleveland, O.
Cole-Sewell Engineering Co., St. Paul, Minn.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Engineer Co., New York, N. Y.
Field Control Div., H. D. Conkey & Co., Mendota, Ill.
● Foster Wheeler Corp., New York, N. Y.
Foxboro Co., Foxboro, Mass.
Fuelguard Co., Dallas, Tex.
General Blower Co., Inc., Philadelphia, Pa.
General Power Plant Corp., New York, N. Y.
Hagan Corp., Pittsburgh, Pa.
● Hays Corp., Michigan City, Ind.
● Illinois Engineering Co., Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
Kol-Master Corp., Oregon, Ill.
Krueger Sentry Gauge Co., Green Bay, Wis.
Leeds & Northrup Co., Philadelphia, Pa.
Locke Regulator Co., Salem, Mass.
Mason-Neilan Regulator Co., Boston, Mass.
● Mercoid Corp., The, Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Perfex Corp., Milwaukee, Wis.
Preferred Utilities Mfg. Corp., New York, N. Y.
Republic Flow Meters Co., Chicago, Ill. (Industrial)
Ruggles-Klingemann Mfg. Co., Salem, Mass.
Sampsel Time Control, Inc., Spring Valley, Ill.
● Sarcotherm Controls, Inc., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
● Spence Engineering Co., Inc., Walden, N. Y.
● Webster Engineering Co., Tulsa, Okla.

REGULATORS, LEVEL, LIQUID

Automatic Control Co., St. Paul, Minn.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Belfield Valve, Div. of Minneapolis-Honeywell, Philadelphia Pa.
Boylston Steam Specialty Co., Chicago, Ill.
Bristol Co., The, Waterbury, Conn.
Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Burrows Mfg. Co., F. A., York, Pa.
Cooper Co., Clark, Palmyra, N. J.
Coral Designs, Forest Hills, N. Y.
Cutler-Hammer, Inc., Milwaukee, Wis.
Davis Regulator Co., Chicago, Ill.
Defender Instrument & Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Eclipse Fuel Engineering Co., Rockford, Ill.
Fischer & Porter Co., Hatboro, Pa.
● Fisher Governor Co., Marshalltown, Ia.
Foxboro Co., Foxboro, Mass.
Griscom-Russell Co., The, New York, N. Y.
Grove Regulator Co., Oakland, Calif.
● Hays Corp., Michigan City, Ind.
Johnson Corp., The, Three Rivers, Mich.
Kieley & Mueller, Inc., North Bergen, N. J
Kisco Boiler & Engineering Co., St. Louis, Mo.
Klipfel Valves, Inc., Div. of Hamilton-Thomas Corp., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Magnetrol, Inc., Chicago, Ill.
Mason-Nielan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Newark Boiler Regulator Co., Inc., Bloomfield, N. J.
Northern Equipment Co., Erie, Pa.
Penn Electric Switch Co., Goshen, Ind.
R-S Products Corp., Philadelphia, Pa.
● Taylor Instrument Companies, Rochester, N. Y.
Trimount Instrument Co., Chicago, Ill.

REGULATORS, PRESSURE, AIR

American Meter Co., Inc., New York, N. Y.
Askania Regulator Co., Chicago, Ill.
Atlas Valve Co., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Barber-Colman Co., Rockford, Ill.
Belfield Valve Div. of Minneapolis-Honeywell, Philadelphia, Pa.
Binks Mfg. Co., Chicago, Ill.
Black Mfg. Co., The, Baltimore, Md.
Boylston Steam Specialty Co., Chicago, Ill.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Burrows Mfg. Co., F. A., York, Pa.
CCA Products, Inc., Glendale, Calif.
● Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Clark Mfg. Co., Cleveland, O.
Conoflow Corp., Philadelphia, Pa.
Cook Electric Co., Diaphlex Div., Chicago, Ill.

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Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Cutler-Hammer, Inc., Milwaukee, Wis.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
DeVilbiss Co., The, Toledo, O.
Dockson Corp., Detroit, Mich.
Douglass Automatic Controls Co., South Gate, Calif.
Eclipse Fuel Engineering Co., Rockford, Ill.
Electric Sprayit Co., The, Sheboygan, Wis.
● Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
Greiner Co., Emil, New York, N. Y.
Grove Regulator Co., Oakland, Calif.
Hagan Corp., Pittsburgh, Pa.
● Hays Corp., Michigan City, Ind.
Hotstream Heater Co., Cleveland, O.
Hubbell Corp., Chicago, Ill.
● Illinois Engineering Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Keller Tool Co., Grand Haven, Mich.
Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Valves, Inc., Div. of Hamilton-Thomas Corp., Hamliton O.
Leslie Co., Lyndhurst, N. J.
Mason-Nielan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
● Mercoid Corp., The, Chicago, Ill.
Modern Engineering Co., St. Louis, Mo.
Monitor Controller Co., The, Boston, Mass.
Moore Products Co., Philadelphia, Pa.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
National Cylinder Gas Co., Chicago, Ill.
Norgren Co., C. A., Denver, Colo.
North Penn Co., New York, N. Y.
Paasche Airbrush Co., Chicago, Ill.
Penn Electric Switch Co., Goshen, Ind.
Pittsburgh Equitable Meter Div., Rockwell Mfg. Co., Pittsburgh, Pa.
R-S Products Corp., Philadelphia, Pa.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
Schade Valve Mfg. Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
● Spence Engineering Co., Inc., Walden, N. Y.
Spray Engineering Co., Somerville, Mass.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
● Strong, Carlisle & Hammond Co., Cleveland, O.
Tagliabue Corp., C. J., Newark, N. J.
● Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Tryco Products, Inc., Westfield, Mass.
United Electric Controls Co., Watertown, Mass.
Victor Equipment Co., San Francisco, Calif.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
Yula Water Heaters, Inc., New York, N. Y.

REGULATORS, PRESSURE, GAS

● American District Steam Co., North Tonawanda, N. Y.
American Meter Co., Inc., New York, N. Y.
Askania Regulator Co., Chicago, Ill.
Atlas Valve Co., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Barber-Colman Co., Rockford, Ill.
Barber Gas Burner Co., Cleveland, O.
Belfield Valve Div. of Minneapolis-Honeywell, Philadelphia, Pa.
Black Mfg. Co., The, Baltimore, Md.
Boylston Steam Specialty Co., Chicago, Ill.
Bristol Co., The, Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
● Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Clark Mfg. Co., Cleveland, O.
Conoflow Corp., Philadelphia, Pa.
Cook Electric Co., Diaphlex Div., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Dockson Corp., Detroit, Mich.
Douglass Automatic Controls Co., South Gate, Calif.
Eclipse Fuel Engineering Co., Rockford, Ill.
● Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Fox Control & Mfg. Co., Cleveland, O.
Foxboro Co., Foxboro, Mass.
Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
● General Controls Co., Glendale, Calif.
Greiner Co., Emil, New York, N. Y.
Grove Regulator Co., Oakland, Calif.
Hagan Corp., Pittsburgh, Pa.
Harris Calorific Co., The, Cleveland, O.
● Hays Corp., Michigan City, Ind.
Hubbell Corp., Chicago, Ill.
● Illinois Engineering Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Valves, Inc., Div. of Hamilton-Thomas Corp., Hamliton O.
Leslie Co., Lyndhurst, N. J.
Liquid Carbonic Corp., The, Chicago, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
● Mercoid Corp., The, Chicago, Ill.
Modern Engineering Co., St. Louis, Mo.
Monitor Controller Co., The, Boston, Mass.
Moore Products Co., Philadelphia, Pa.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
National Cylinder Gas Co., Chicago, Ill.
Norgren Co., C. A., Denver, Colo.
Penn Electric Switch Co., Goshen, Ind.
Pittsburgh Equitable Meter Div., Rockwell Mfg. Co., Pittsburgh, Pa.
Positive Control Co., The, Cincinnati, O.
● Powers Regulator Co., Chicago, Ill.
R-S Products Corp., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill. (Industrial)
Ruggles Klingemann Mfg. Co., Salem, Mass.
Schade Valve Mfg. Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
● Spence Engineering Co., Inc., Walden, N. Y.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Staples & Pfeiffer, San Francisco, Calif.
● Strong, Carlisle & Hammond Co., Cleveland, O.
Tagliabue Corp., C. J., Newark, N. J.
● Taylor Instrument Companies, Rochester, N. Y.
Thermac Co., Los Angeles, Calif.
Trerice Co., H. O., Detroit, Mich.
United Electric Controls Co., Watertown, Mass.
Victor Equipment Co., San Francisco, Calif.
Wall Chemicals Div. of The Liquid Carbonic Corp., Chicago, Ill.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.

REGULATORS, PRESSURE, HOT WATER HEATING SYSTEMS

Bailey Co., Chas., M., San Francisco, Calif.
Barber-Colman Co., Rockford, Ill.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
● Bell & Gossett Co., Morton Grove, Ill.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Burrows Mfg. Co., F. A., York, Pa.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Chicago Specialty Mfg. Co., Chicago, Ill.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
● Detroit Lubricator Co., Detroit, Mich.
Douglass Automatic Controls Co., South Gate, Calif.
● Fisher Governor Co., Marshalltown, Ia.
● Illinois Engineering Co., Chicago, Ill .
Kainer and Co., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
Klipfel Valves, Inc., Div. of Hamilton-Thomas Corp., Hamliton O.
McAlear Mfg. Co., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
● Mercoid Corp., The, Chicago, Ill.
Mueller Co., Decatur, Ill.
Penn Electric Switch Co., Goshen, Ind.
Sall Bros. Co., Rockford, Ill.
● Sarcotherm Controls, Inc., New York, N. Y.
Taco Heaters, Inc., Providence, R. I.
● Thrush & Co., H. A., Peru, Ind.
● Trane Co., The, LaCrosse, Wis.
Watts Regulator Co., Lawrence, Mass.
● White-Rodgers Electric Co., St. Louis, Mo.
Yula Water Heaters Inc., New York, N. Y.

REGULATORS, PRESSURE, LIQUID

Askania Regulator Co., Chicago, Ill.
Atlas Valve Co., Newark, N. J.
Automatic Control Co., St. Paul, Minn.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Barber-Colman Co., Rockford, Ill.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
Belfield Valve Div. of Minneapolis-Honeywell, Philadelphia, Pa.
Boylston Steam Specialty Co., Chicago, Ill.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
● Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Clark Controller Co., Cleveland, O.
Conoflow Corp., Philadelphia, Pa.
Cook Electric Co., Diaphlex Div., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Cutler-Hammer, Inc., Milwaukee, Wis.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.

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Douglass Automatic Controls Co., South Gate, Calif.
● Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Foxboro Co., Foxboro, Mass.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Regulator Co., Oakland, Calif.
Hagan Corp., Pittsburgh, Pa.
● Hays Corp., Michigan City, Ind.
Healy Ruff Co., St. Paul, Minn.
Hubbell Corp., Chicago, Ill.
● Johnson Service Co., Milwaukee, Wis.
Justus Steam Trap Co., Napanoch, N. Y.
Keckley Co., O. C., Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Valves, Inc., Div. of Hamilton-Thomas Corp., Hamliton O.
Leslie Co., Lyndhurst, N. J.
Locke Regulator Co., Salem, Mass.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
● Mercoid Corp., The, Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Monarch Mfg. Wks., Inc., Philadelphia, Pa.
Monitor Controller Co., The, Boston, Mass.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Newark Boiler Regulator Co., Inc., Bloomfield, N. J.
Norgren Co., C. A., Denver, Colo.
Penn Electric Switch Co., Goshen, Ind.
● Powers Regulator Co., Chicago, Ill.
R-S Products Corp., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
Schade Valve Mfg. Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
● Spence Engineering Co., Inc., Walden, N. Y.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Staples & Pfeiffer, San Francisco, Calif.
Stickle Steam Specialties Co., Indianapolis, Ind.
● Strong, Carlisle & Hammond Co., Cleveland, O.
● Swartwout Co., Cleveland, O.
Tagliabue Corp., C. J., Newark, N. J.
● Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Tryco Products, Inc., Westfield, Mass.
United Electric Controls Co., Watertown, Mass.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
● White-Rodgers Electric Co., St. Louis, Mo.
Williams Gauge Co., The, Pittsburgh, Pa. (Feed water)

REGULATORS, STATIC PRESSURE, AIR DUCT

Bailey Co., Chas. M., San Francisco, Calif.
Barber-Colman Co., Roekford, Ill.
Bristol Co., The, Waterbury, Conn.
● Cash Co., A. W., Decatur, Ill.
Cooper Co., Clark, Palmyra, N. J.
Coral Designs, Forest Hills, N. Y.
● Hays Corp., Michigan City, Ind.
Hotstream Heater Co., Cleveland, O.
● Johnson Service Co., Milwaukee, Wis.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
● Powers Regulator Co., Chicago, Ill.
Shallcross Controls, Inc., Milwaukee, Wis.

REGULATORS, TEMPERATURE

American Instrument Co., Silver Spring, Md.
Armstrong Control Co., Inc., Portland, Ore.
Atlas Valve Co., Newark, N. J.
● Autempco Corp., New York, N. Y.
Automatic Devices Co., Inc., Chicago, Ill.
Automatic Products Co., Milwaukee, Wis.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Burling Instrument Co., Newark, N. J.
Cook Electric Co., Diaphlex Div., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Crise Mfg. Co., The, Columbus, O.
Crown Controls Co., Inc., New Bremen, O.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
● Detroit Lubricator Co., Detroit, Mich.
Douglass Automatic Controls Co., South Gate, Calif.
● Dunham Co., C. A., Chicago, Ill.
Eastern Industries, Inc., New Haven, Conn.
Eclipse Fuel Engineering Co., Rockford, Ill.
Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.
Foster Engineering Co., Union, N. J.
Foxboro Co., Foxboro, Mass.
● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
● General Controls Co., Glendale, Calif.
Gleason-Avery, Inc., Auburn, N. Y.
H-B Instrument Co., Philadelphia, Pa.
Hagan Corp., Pittsburgh, Pa.
Hart Mfg. Co., The, Hartford, Conn.
● Hays Corp., Michigan City, Ind.
Heat Timer Corp., New York, N. Y.
● Illinois Engineering Co., Chicago, Ill.
● Johnson Service Co., Milwaukee, Wis.
Keckley Co., O. C., Chicago, Ill.
Klipfel Valves, Inc., Div. of Hamilton-Thomas Corp., Hamliton O.
Lawler Automatic Controls, Inc., Mount Vernon, N. Y.
Leslie Co., Lyndhurst, N. J.
Locke Regulator Co., Salem, Mass.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
● Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
McAlear Mfg. Co., Chicago, Ill.
McCorkle Co., D. H., Berkeley, Calif.
● Mercoid Corp., Chicago, Ill.
Miller-Harris Instrument Co., Milwaukee, Wis.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Mueller Steam Specialty Co. Inc., Long Island City, N. Y.
Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
● Powers Regulator Co., Chicago, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.
R-S Products Corp., Philadelphia, Pa.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
Scientific Instrument Co., Detroit, Mich.
● Spence Engineering Co., Inc., Walden, N. Y.
Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
● Sterling, Inc., Milwaukee, Wis.
Tagliabue Corp., C. J., Newark, N. J.
● Taylor Instrument Companies, Rochester, N. Y.
Thermac Co., Los Angeles, Calif.
Trerice Co., H. O., Detroit, Mich.
Triplex Heating Specialty Co., Inc., Peru, Ind.
United Electric Controls Co., Watertown, Mass.
Watson & McDaniel Co., Philadelphia, Pa.
Wheelco Instruments Co., Chicago, Ill.
White Mfg. Co., St. Paul, Minn.
● White-Rodgers Electric Co., St. Louis, Mo.

RELAYS, ELECTRICAL

Advance Electric and Relay Co., Los Angeles, Calif.
● Allen-Bradley Co., Milwaukee, Wis.
Allied Control Co., Inc., New York, N. Y.
American Gas Accumulator Co., Elizabeth, N. J. (time delay)
American Instrument Co., Silver Spring, Md.
Arrow-Hart & Hegeman Elect. Co., Hartford, Conn.
● Autempco Corp., New York, N. Y.
Automatic Electric Mfg. Co., Mankato, Minn.
Automatic Switch Co., Orange, N. J.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
B/W Controller Corp., Birmingham, Mich.
Barber-Colman Co., Rockford, Ill.
Benjamin Electric Mfg. Co., Der Plaines, Ill.
Clark Controller Co., Cleveland, O.
Consolidated Car Heating Co., Inc., Albany, N. Y.
Cook Electric Co., Diaphlex Div., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Cramer Co., Inc., R. W., The, Centerbrook, Conn.
Cutler-Hammer Inc., Milwaukee, Wis.
Davis & Co., Dean W., Kentland, Ind.
● Detroit Lubricator Co., Detroit, Mich.
Durakool, Inc., Elkhart, Ind.
Edison, Inc., Thos. A., Instrument Div., West Orange, N. J.
Electro-Switch & Controls Inc., Culver City, Calif.
Ess Instrument Co., Bergenfield, N. J.
● General Controls Co., Glendale, Calif.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Gleason-Avery, Inc., Auburn, N. Y.
Guardian Electric Mfg. Co., Chicago, Ill.
H-B Instrument Co., Philadelphia, Pa.
Industrial Engineering Corp., Terre Haute, Ind.
Leach Relay Co., Los Angeles, Calif.
McCorkle Co., D. H., Berkeley, Calif.
McQuay-Norris Mfg. Co., St. Louis, Mo.
● Mercoid Corp., Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Monitor Controller Co., The, Boston, Mass.
National Time & Signal Corp., Detroit, Mich.
Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Philadelphia Thermometer Co., Philadelphia, Pa.
Potter & Brumfield Sales Co., Princeton, Ind.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Sampsel Time Control, Inc., Spring Valley, Ill.
Skaneateles Mfg. Co., Inc., Syracuse, N. Y.
Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Struthers-Dunn, Inc., Philadelphia, Pa.
Synchro-Start Products, Inc., Chicago, Ill.
● Thrush & Co., H. A., Peru, Ind.
Tork Clock Co., Inc., Mt. Vernon, N. Y.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Wallace & Tiernan Co., Inc., Newark, N. J.

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● Ward Leonard Electric Co., Mt. Vernon, N. Y.
● Westinghouse Electric Corp., Pittsburgh, Pa.
Weston Electrical Instrument Corp., Newark, N. J.
● White-Rodgers Electric Co., St. Louis, Mo.
Zenith Electric Co., Chicago, Ill.

RELIEF VALVES

See Valves, Relief

REPAIR CLAMPS

See Clamps, Pipe Repair

REPAIR PLUGS FOR TANKS

See Plugs, Repair, for Tanks

RESEATERS, VALVE

Chicago Specialty Mfg. Co., Chicago, Ill.
Economy Valve Seat Co., Chicago, Ill.
Independent Pneumatic Tool Co., Aurora, Ill.
Leavitt Machine Co., Orange, Mass.
Skinner Co., M. B., South Bend, Ind.
Standard Reseater Corp., New York, N. Y.

REVERSE REFRIGERATION CYCLE UNITS

See Units, Air Conditioning, Reverse Refrigeration Cycle

RINGS, PISTON, FOR COMPRESSORS

McQuay-Norris Mfg. Co., St. Louis, Mo.
Perfect Circle Corp., Hagerstown, Md.
Piston Ring Div., Koppers Co., Inc., Baltimore, Md.
Sealed Power Corp., Muskegon, Mich.

RINGS, WELDING

Flori Pipe Co., The, St. Louis, Mo.
● Tube Turns, Inc., Louisville, Ky.
Wedge Protectors, Inc., Cleveland, O.

ROD, GAS WELDING

Air Reduction Sales Co., New York, N. Y.
All-State Welding Alloys Co., Inc., White Plains, N. Y.
Allied Weld-Craft, Inc., Indianapolis, Ind.
Aluminum Co. of America, Pittsburgh, Pa.
American Brass Co., Waterbury, Conn.
American Steel & Wire Co., United States Steel Corp., Subsidiary, Cleveland, O.
Atlantic Steel Co., Atlanta, Ga.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Crucible Steel Co. of America, New York, N. Y.
Dow Chemical Co., The, Midland, Mich.
Duraloy Co., Scottdale, Pa. (Stainless)
Eutectic Welding Alloys Corp., New York, N. Y.
International Nickel Co., Inc., The, New York, N. Y.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Marquette Mfg. Co., Minneapolis, Minn.
Maurath, Inc., Cleveland, O.
Mir-O-Col Alloy Co., Los Angeles, Calif.
Modern Engineering Co., St. Louis, Mo.
National Cylinder Gas Co., Chicago, Ill.
Page Steel & Wire Division of American Chain & Cable Co., Inc., Monessen, Pa.
● Revere Cooper and Brass, Incorporated, New York, N. Y.
Victor Equipment Co., San Francisco, Calif.
● Youngstown Sheet & Tube Co., Youngstown, O.

ROLLER BEARINGS

See Bearings, Roller

ROOF COOLERS

See Systems, Roof Spraying

ROOF SPRAYING SYSTEMS

See Systems, Roof Spraying

ROOF VENTILATORS

See Ventilators, Roof

ROOM HUMIDIFIERS

See Humidifiers, Unit, Room Type; and Units, Air Conditioning, Winter

ROOM THERMOSTATS

See Thermostats, Room or Wall

ROTARY PUMPS

See Pumps, Rotary

RUBBER BELTING

See Belting, Flat, Rubber

RUBBER PACKING

See Packing, Rubber and Synthetic

RUBBER PIPE

See Pipe, Hard Rubber

SADDLE VALVES

See Valves, Saddle

SAFETY VALVES

See Valves, Safety, Steam

SCAFFOLDS, MOVABLE

● Up-Right Scaffolds, Berkeley, Calif.

SCALE CONTROL

See Devices, Electrolytic; Treatment, Steam System; Treatment, Water

SCALE REMOVAL, CHEMICAL SERVICE FOR

Anderson-Stolz Corp., Kansas City, Mo.
Apex Engineering Co., Chicago, Ill.
● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Dearborn Chemical Co., Chicago, Ill.
Dowell Inc., Tulsa, Okla.
Oakite Products, Inc., New York, N. Y.
O'Brien Industries, Jersey City, N. J.

SCREENS, SUN REFLECTING

Ingersoll Steel Div., Borg-Warner Corp., Chicago, Ill.
● Kaiser Aluminum & Chemical Corp., Oakland, Calif.
Kane Mfg. Corp., Kane, Pa.

SCREWS, SHEET METAL

Aluminum Co. of America, Pittsburgh, Pa.
American Screw Co., Providence, R. I.
Continental Screw Co., New Bedford, Mass.
● Elco Tool & Screw Corp., Rockford, Ill.
Industrial Screw Co., Chicago, Ill.
Lamson & Sessions Co., Cleveland, O.
National Lock Co., Inc., Rockford, Ill.
Parker-Kalon Corp., New York, N. Y.
Pheoll Mfg. Co., Chicago, Ill.
Rockford Screw Products Co., Rockford, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Scovill Mfg. Co., Waterbury, Conn.
Shakeproof, Inc., Chicago, Ill.
United States Register Co., Battle Creek, Mich.

SEALS, SHAFT, MECHANICAL

Chicago Seal Co., Chicago, Ill.
Cook Electric Co., Diaphlex Div., Chicago, Ill.
Crane Packing Co., Chicago, Ill.
Felt Products Mfg. Co., Chicago, Ill.
Garlock Packing Co., Palmyra, N. Y.
Johns-Manville, New York, N. Y.
Peerless Pump Div., Food Machinery and Chemical Corp., Los Angeles, Calif.
Rotary Seal Co., Chicago, Ill.
Schwitzer-Cummins Co., Indianapolis, Ind.
Sealol Corp., Providence, R. I.
Syntron Co., Homer City, Pa.

SEAMLESS PIPE

See Pipe, Steel, Seamless

SEPARATORS, AIR

Adams Co., Inc., R. P., Buffalo, N. Y.
Binks Mfg. Co., Chicago, Ill.
Bowser, Inc., Fort Wayne, Ind.
Centrifix Corp., Cleveland, O.
Clark Mfg. Co., Cleveland, O.
Cochrane Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
DeVilbiss Co., The, Toledo, O.
● Dollinger Corp., Rochester, N. Y.
Gasflux Co., Mansfield, O.
Goodyer Industries, Inc., Chicago, Ill.
Hagan Corp., Pittsburgh, Pa.
● Illinois Engineering Co., Chicago, Ill.
Johnson Corp., Three Rivers, Mich.
Keckley Co., O. C., Chicago, Ill.
Kraissl Co., Inc., The, Hackensack, N. J.
Leavitt Machine Co., Orange, Mass.
Logan Engineering Co., Chicago, Ill.
● Nicholson & Co., W. H., Wilkes-Barre, Pa.
Spencer Turbine Co., Hartford, Conn.
Spray Engineering Co., Somerville, Mass.
● Strong, Carlisle & Hammond Co., Cleveland, O.
● Swartwout Co., Cleveland, O.

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Textile Corp., Chicago, Ill.
Trerice Co., H. O., Detroit, Mich.
Wright-Austin Co., Detroit, Mich.

SEPARATORS, FLANGE

Kraissl Co., Inc., The, Hackensack, N. J.
Williams & Co., J. H., Buffalo, N. Y.

SEPARATORS, STEAM AND OIL

● Acme Industries, Inc., Jackson, Mich.
Adams Co., Inc., R. P., Buffalo, N. Y.
● American District Steam Co., North Tonawanda, N. Y.
Aminco Refrigeration Products Co., Detroit, Mich.
Armstrong Co., Richard M., Westchester, Pa.
Boylston Steam Specialty Co., Chicago, Ill.
Centrifix Corp., Cleveland, O. (Gas and Vapor)
Clark Mfg. Co., Cleveland, O.
Cochrane Corp., Philadelphia, Pa.
● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
● Fisher Governor Co., Marshalltown, Ia.
Goodyer Industries, Inc., Chicago, Ill.
Hagan Corp., Pittsburgh, Pa.
Hoppes Mfg. Co., Inc., Springfield, O.
● Illinois Engineering Co., Chicago, Ill.
Johnson Corp., The, Three Rivers, Mich.
Kieley & Mueller, Inc., North Bergen, N. J.
Kraissl Co., Inc., The, Hackensack, N. J.
Morehead Mfg. Co., Detroit, Mich.
National Valve & Mfg. Co., Pittsburgh, Pa.
● Nicholson & Co., W. H., Wilkes-Barre, Pa.
Richmond Engineering Co., Inc., Richmond, Va.
Schutte & Koerting Co., Philadelphia, Pa.
Sims Co., Erie, Pa.
Stickle Steam Specialties Co., Indianapolis, Ind.
● Strong, Carlisle & Hammond Co., Cleveland, O.
● Swartwout Co., Cleveland, O.
Temprite Products Corp., Detroit, Mich.
Textite Corp., Chicago, Ill.
Thermix Corp., The, Greenwich, Conn.
Wabash Mfg. Co., Chicago, Ill.
Warner Lewis Co., Tulsa, Okla.
● Webster & Co., Warren, Camden, N. J.
Wilson Engineering Corp., Chicago, Ill.
Worthington Pump & Machinery Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
Wright-Austin Co., Detroit, Mich.

SEWAGE EJECTORS

See Ejectors, Sewage

SEWAGE PUMPS

See Pumps, Sewage

SHAFT SEALS, MECHANICAL

See Seals, Shaft, Mechanical

SHAFTS, FLEXIBLE, PUSH-PULL, FOR CONTROL

Arens Controls, Inc., Chicago, Ill.
Mall Tool Co., Chicago, Ill.
Piezo Mfg. Corp., New York, N. Y.
Stow Mfg. Co., Binghamton, N. Y.

SHEARS, ELECTRIC, PORTABLE

Black & Decker Mfg. Co., Towson, Md.
G. D. S. Machinery & Supply Co., Inc., New York, N. Y.
Independent Pneumatic Tool Co., Aurora, Ill.
M-M-A, Inc., Lancaster, Pa.
O'Neil Irwin Mfg. Co., Lake City, Minn.
Skilsaw, Inc., Chicago, Ill.
Stanley Electric Tools, Div. of The Stanley Works, New Britain, Conn.
Van Dorn Electric Tool Co., Towson, Md.

SHEARS, POWER

Barth Mfg. Co., Milldale, Conn.
Bertsch & Co., Inc., Cambridge City, Ind.
Bliss Co., E. W., Detroit, Mich.
Buckeye Tools Corp., Dayton, O.
● Buffalo Forge Co., Buffalo, N. Y.
Cincinnati Shaper Co., Cincinnati, O.
Cleveland Punch & Shear Works Co., Cleveland, O.
Cleveland Tramrail Div., Cleveland Crane & Eng. Co., Wickliffe, O.
Diamond Machine Tool Co., Los Angeles, Calif.
Dreis Co., Ltd., Edward J., San Carlos, Calif.
Excelsior Tool & Machine Co., East St. Louis, Ill.
Famco Machine Co., Racine, Wis.
Frederick Iron & Steel Inc., Frederick, Md.
H-A Mfg. Co., York, Pa.
Heartley Machine & Tool Co., Toledo, O.
Hendley & Whittemore, Beloit, Wis.
Kling Bros. Engineering Works, Chicago, Ill.
Libert Machine Co., Green Bay, Wis.
Marshalltown Mfg. Co., Marshalltown, Ia.
Niagara Machine & Tool Wks., Buffalo, N. Y.
O'Neil Irwin Mfg. Co., Lake City, Minn.
Peck, Stow & Wilcox Co., Southington, Conn.
Quickwork Div., Whiting Corp., Harvey, Ill.
St. Louis Tool Co., St. Louis, Mo.
Streine Tool & Mfg. Co., New Bremen, O.
Whiting Corp., Harvey, Ill.
Whitney Metal Tool Co., Rockford, Ill.
Wysong & Miles, Greensboro, N. C.

SHEARS AND SNIPS, HAND

Armstrong-Blum Mfg. Co., Chicago, Ill.
Bartlett Mfg. Co., Detroit, Mich.
Beverly Shear Mfg. Co., Chicago, Ill.
Black & Decker Mfg. Co., Towson, Md. (electrically driven)
Bremil Mfg. Co., Erie, Pa.
Champion Blower & Forge Co., Lancaster, Pa.
Crescent Tool Co., Jamestown, N. Y.
Excelsior Tool & Machine Co., East St. Louis, Ill.
G. D. S. Machinery & Supply Co., Inc., New York, N. Y.
Grobet File Corp. of America, New York, N. Y.
Henkel-Clauss Co., The, Fremont, O.
Kidder Mfg. Co., Inc., J. F., Burlington, Vt. (Angle)
Klenk's Aviation Snips, Wilmington, Del.
Niagara Machine & Tool Wks., Buffalo, N. Y.
O'Neil Irwin Mfg. Co., Lake City, Minn.
Peck, Stow & Wilcox Co., Southington, Conn.
Snap-on Tools Corp., Kenosha, Wis.
Super Mfg. Corp., Chicago, Ill.
Viking Shear Co., Erie, Pa.
Whitney Metal Tool Co., Rockford, Ill.
Wiss & Sons Co., J., Newark, N. J.

SHEAVES

See Pulleys and Sheaves, for Belt Drives

SHEET METAL BRAKES

See Brakes, Sheet Metal

SHEET METAL DUCTS

See Ducts and Duct Fittings, Prefabricated

SHEET METAL FITTINGS

See Ducts and Duct Fittings, Prefabricated

SHEET METAL PUNCHES

See Punches, Sheet Metal

SHEETS, ALUMINUM

Aluminum Co. of America, Pittsburgh, Pa.
American Nickeloid Co., Peru, Ill. (Nickel and chromium plated)
Colonial Alloys Co., Metals Div., Philadelphia, Pa.
Fairmont Aluminum Co., Fairmont, W. Va.
● Kaiser Aluminum & Chemical Corp., Oakland, Calif.
Reynolds Metals Co., Louisville, Ky.

SHEETS, ALUMINUM COATED

Armco Steel Corp., Middletown, O.

SHEETS AND BOARD, NON-METALLIC, FOR DUCT CONSTRUCTION

Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Celotex Corp., The, Chicago, Ill.
Grant Wilson Inc., Chicago, Ill.
Johns-Manville, New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa.
Keystone Asphalt Products Co., Chicago, Ill.
Ruberoid Co., New York, N. Y.
● Sall Mountain Co., Chicago, Ill.
Technical Ply-Woods, Chicago, Ill.
United States Gypsum Co., Chicago, Ill.

SHEETS, CLAD

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
Aluminum Co. of America, Pittsburgh, Pa.
American Nickeloid Co., Peru, Ill.
Armco Steel Corp., Middletown, O.
Follansbee Steel Corp., Pittsburgh, Pa.
Ingersoll Steel Div., Borg-Warner Corp., Chicago, Ill.
Jessop Steel Co., Washington, Pa.
Lukens Steel Co. and Divisions, Coatesville, Pa.
● Revere Copper & Brass, Inc., New York, N. Y.

SHEETS, COPPER

American Brass Co., Waterbury, Conn.
American Nickeloid Co., Peru, Ill. (Nickel and chromium plated)

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Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Hussey & Co., C. G., Pittsburgh, Pa.
New Haven Copper Co., Seymour, Conn.
● Revere Copper and Brass, Inc., New York, N. Y.
Western Brass Mills, Div. of Olin Industries, Inc., East Alton, Ill. (Brass, bronze, phosphor bronze)

SHEETS, LEAD

Alpha Metals, Inc., Brooklyn, N. Y.
Belmont Smelting & Refining Wks., Inc., Brooklyn, N. Y.
Division Lead Co., Chicago, Ill.
Eagle-Picher Co., Cincinnati, O.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Flemm Lead Co., Inc., Long Island City, N. Y.
Illinois Zinc Co., Chicago, Ill.
Lissberger & Son, Inc., Marks, Long Island City, N. Y.
National Lead Co., New York, N. Y.
Northwest Lead Co., Seattle, Wash.
Rochester Lead Wks., Rochester, N. Y.
Standard Rolling Mills, Inc., Brooklyn, N. Y.
Weirton Steel Co., Weirton, W. Va. (Alloy coated)

SHEETS, MAGNESIUM ALLOY

Dow Chemical Co., The, Midland, Mich.

SHEETS, METAL, WITH PROTECTIVE NON-METALLIC COATING

American Nickeloid Co., Peru, Ill.
American Steel Band Co., Pittsburgh, Pa.
Cheney Flashing Co., Trenton, N. J.
Plasteel Products Co., Washington, Pa.
Robertson Co., H. H., Pittsburgh, Pa.
Technical Ply-Woods, Chicago, Ill. (Metal and plywood)

SHEETS, NICKEL AND NICKEL ALLOY

American Nickeloid Co., Peru, Ill.
International Nickel Co., Inc., The, New York, N. Y.
Lukens Steel Co. and Divisions, Coatesville, Pa.
● Revere Copper and Brass Incorporated, New York, N. Y.
Western Brass Mills, Div. of Olin Industries, Inc., East Alton, Ill.

SHEETS, STEEL, COPPER BEARING

Armco Steel Corp., Middletown, O.
Berger Mfg. Div., Republic Steel Corp., Canton, O.
Bethlehem Steel Co., Bethlehem, Pa.
● Carnegie-Illinois Steel Corp., (Sub. United States Steel Corp.), Pittsburgh, Pa.
● Columbia Steel Co. (Sub. United States Steel Corp.), San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Follansbee Steel Corp., Pittsburgh, Pa.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., Chicago, Ill.
Lukens Steel Co. and Divisions, Coatesville, Pa.
Lyon, Conklin & Co., Inc., Baltimore, Md. (Chromium, nickel, copper, iron alloy)
Newport Steel Corp., Rolling Mill Div., Newport, Ky.
Niles Rolling Mill Co., Niles, O.
Republic Steel Corp., Cleveland, O.
Sharon Steel Corp., Sharon, Pa.
● Tennessee Coal, Iron & Railroad Co., United States Steel Corp., Subsidiary, Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
● Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS, STEEL, GALVANIZED

Apollo Steel Co., Apollo, Pa.
Armco Steel Corp., Middletown, O.
Berger Mfg. Div., Republic Steel Corp., Canton, O.
Bethlehem Steel Co., Bethlehem, Pa.
● Carnegie-Illinois Steel Corp., (Sub. United States Steel Corp.), Pittsburgh, Pa.
● Columbia Steel Co. (Sub. United States Steel Corp.), San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Empire Sheet & Tin Plate Co., Mansfield, O.
Great Lakes Steel Corp., Detroit, Mich.
Inland Steel Co., Chicago, Ill.
Newport Steel Corp., Rolling Mill Div., Newport, Ky.
Niles Rolling Mill Co., Niles, O.
Republic Steel Corp., Cleveland, O.
Sharon Steel Corp., Sharon, Pa.
● Tennessee Coal, Iron & Railroad Co., United States Steel Corp., Subsidiary, Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Wood Steel Co., Alan, Conshohocken, Pa.

SHEETS, STEEL, GALVANNEALED

Berger Mfg. Div., Republic Steel Corp., Canton, O.
● Carnegie-Illinois Steel Corp., (Sub. United States Steel Corp.), Pittsburgh, Pa.
Continental Steel Corp., Kokomo, Ind.
Newport Steel Corp., Rolling Mill Div., Newport, Ky.
Niles Rolling Mill Co., Niles, O.
Republic Steel Corp., Cleveland, O.
Sharon Steel Corp., Sharon, Pa.

SHEETS, STEEL, STAINLESS

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
Armco Steel Corp., Middletown, O.
Berger Mfg. Div., Republic Steel Corp., Canton, O.
● Carnegie-Illinois Steel Corp., (Sub. United States Steel Corp.), Pittsburgh, Pa.
Crucible Steel Co. of America, New York, N. Y.
● Duriron Co., Inc., The, Dayton, O.
Eastern Stainless Steel Corp., Baltimore, Md.
Ingersoll Steel Div., Borg-Warner Corp., Chicago, Ill.
Jessop Steel Co., Washington, Pa.
Republic Steel Corp., Cleveland, O.
Sharon Steel Corp., Sharon, Pa.
Superior Steel Corp., Pittsburgh, Pa.
● Tennessee Coal, Iron & Railroad Co., United States Steel Corp., Subsidiary, Birmingham, Ala.
Universal Cyclops Steel Corp., Bridgeville, Pa.
Washington Steel Corp., Washington, Pa.

SHEETS, WROUGHT IRON

Byers Co., A. M., Pittsburgh, Pa.

SHEETS, ZINC

American Nickeloid Co., Peru, Ill. (Nickel and chromium plated)
American Zinc Products Co., Greencastle, Ind.
Belmont Smelting & Refining Wks., Inc., Brooklyn, N. Y.
Hegeler Zinc Co., Danville, Ill.
Illinois Zinc Co., Chicago, Ill.
Matthiessen & Hegeler Zinc Co., La Salle, Ill.
New Jersey Zinc Sales Co., New York, N. Y.

SHUTTERS

See Louvers and Shutters

SIGHT GLASSES

See Glasses, Sight, for Pipe Lines

SIGNALS, LIQUID LEVEL

See Alarms, Liquid Level

SLEEVE BEARINGS

See Bearings, Sleeve

SLEEVES, PIPE REPAIR

See Clamps, Pipe Repair

SLIME AND ALGAE CONTROL, WATER TREATMENT FOR

See Treatment, Water, for Slime and Algae Control

SMOKE ALARMS

See Alarms, Smoke

SMOKE ELIMINATORS

See Jets, Overfire Air, for Smoke Abatement

SMOKE GUNS

See Guns and Pots, Smoke and Smudge

SMUDGE POTS

See Guns and Pots, Smoke and Smudge

SOFTENERS, WATER

Alrose Chemical Co., Providence, R. I.
American Water Softener Co., Philadelphia, Pa.
American Well Works, Aurora, Ill.
Anderson-Stolz Corp., Kansas City, Mo.
Bogue Electric Co., Paterson, N. J.
Cochrane Corp., Philadelphia, Pa.
Duro Co., Dayton, O.
Elgin Softener Corp., Elgin, Ill.
General Filter Co., Ames, Ia.
Heilman Boiler Wks., Inc., Allentown, Pa.
Liquid Conditioning Corp., Philadelphia, Pa.
MacDermid Chemical Co., Bristol, Conn.
Oilux Co., Fort Wayne, Ind.

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Permutit Co., New York, N. Y.
Red Jacket Mfg. Co., Davenport, Ia.
Refinite Corp., Omaha, Neb.
● Research Products Corp., Madison, Wis.
Sta-Rite Products, Inc., Delavan, Wis.
Uniflow Mfg. Co., Erie, Pa.
Warlo Corp., New York, N. Y.

SOLAR HEAT RESISTING SCREENS

See Screens, Sun Reflecting

SOLDER (SILVER), BRAZING ALLOYS, AND FLUXES

Air Reduction Sales Co., New York, N. Y.
All-State Welding Alloys Co., Inc., White Plains, N. Y.
Allen Co., Inc., L. B., Chicago, Ill.
American Brass Co., Waterbury, Conn.
Atkins & Co., E. C., Indianapolis, Ind.
Baker & Co., Inc., Newark, N. J.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
Chase Brass & Copper Co., Waterbury, Conn.
Division Lead Co., Chicago, Ill.
Eutectic Welding Alloys Corp., New York, N. Y.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Handy & Harman, New York, N. Y.
Hardy, Inc., Charles, New York, N. Y.
Industrial Service Laboratories, Milwaukee, Wis.
Johnson Gas Appliance Co., Cedar Rapids, Ia.
Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
Marquette Mfg. Co. Minneapolis Minn.
Mueller Brass Co., Port Huron, Mich.
National Cylinder Gas Co., Chicago, Ill.
Powder Weld Process Co., The, Brooklyn, N. Y.
Soldering Specialties Co., Summit, N. J.
Special Chemicals Corp., New York, N. Y.
Sulflo, Inc., Elizabeth, N. J.
Wabash Mfg. Co., Chicago, Ill.

SOLDER (TIN-LEAD), AND FLUXES

Allen Co., Inc., L. B., Chicago, Ill.
All-State Welding Alloys Co., Inc., White Plains, N. Y.
Alpha Metals, Inc., Brooklyn, N. Y.
Alsoco Corp., New York, N. Y. (Aluminum solder)
American Brass Co., Waterbury, Conn.
American Solder & Flux Co., Philadelphia, Pa.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
Benson Co., Inc., Alex R., Hudson, N. Y.
Burnley Battery & Mfg. Co., North East, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Division Lead Co., Chicago, Ill.
du Pont de Nemours & Co., E. I., Grasselli Chemicals Dept., Wilmington, Del.
Eagle-Picher Co., Cincinnati, O.
Eutectic Welding Alloys Corp., New York, N. Y.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Flemm Lead Co., Inc., Long Island City, N. Y.
Galv-Weld Products, Dayton, O.
Gardiner Metal Co., Chicago, Ill.
Glaser Lead Co., Inc., Brooklyn, N. Y.
Hercules Chemical Co., Inc., New York, N. Y.
Industrial Service Laboratories, Milwaukee, Wis.
Johnson Co., Lloyd S., Chicago, Ill.
Johnson Gas Appliance Co., Cedar Rapids, Ia.
Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
Johnston Foil Mfg. Co., The, St. Louis, Mo.
Kester Solder Co., Chicago, Ill.
Klauer Mfg. Co., Dubuque, Ia.
Lake Chemical Co., Chicago, Ill.
Lenk Mfg. Co., Boston, Mass.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Lissberger & Son, Inc., Marks, Long Island City, N. Y.
Merchant & Evans Co., Philadelphia, Pa.
Mueller Brass Co., Port Huron, Mich.
National Lead Co., New York, N. Y.
Northwest Lead Co., Seattle, Wash.
Paul-Lewis Laboratories, Inc., Milwaukee, Wis.
Powder Weld Process Co., The, Brooklyn, N. Y.
Proved Products Mfg. Co., San Fernando, Calif.
Rochester Lead Works, Inc., Rochester, N. Y.
Rotometals, Inc., San Francisco, Calif.
Ruby Chemical Co., Columbus, O.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Soldering Specialties Co., Summit, N. J.
Special Chemicals Corp., New York, N. Y.
Standard Rolling Mills, Inc., Brooklyn, N. Y.
Sulflo, Inc., Elizabeth, N. J.
Turco Products, Inc., Los Angeles, Calif.
Utility Laboratory, Inc., Brooklyn, N. Y.
Wolfe-Kote Co., Inc., Sheboygan, Wis.

SOLENOIDS AND SOLENOID COILS

● Allen-Bradley Co., Milwaukee, Wis.
Automatic Switch Co., Orange, N. J.
Barber-Colman Co., Rockford, Ill.
Cook Electric Co., Diaphlex Div., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Cutler-Hammer, Inc., Milwaukee, Wis.
Davis & Co., Dean W., Kentland, Ind.
Essex Wire Corp., Div. of, Detroit, Mich.
● General Controls Co., Glendale, Calif.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Guardian Electric Mfg. Co., Chicago, Ill.
● Henry Valve Co., Melrose Park, Ill.
Hubbell Corp., Chicago Ill.
Jefferson Electric Co., Bellwood, Ill.
National Acme Co., The, Cleveland, O.
Soreng Mfg. Co., Schiller Park, Ill.
Synchro-Start Products, Inc., Chicago, Ill.
Trombetta Solenoid Co., Milwaukee, Wis.
West Coast Electrical Mfg. Co., Los Angeles, Calif.

SOLENOID VALVES

See Valves, Solenoid

SOOT BLOWERS

See Blowers, Soot

SOOT DESTROYERS

See Destroyers, Soot, Chemical

SOUND DEADENING FOR DUCTS

See Insulation, Duct, Sound Deadening

SOUND INDICATORS

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SPARGER NOZZLES

See Nozzles, Sparger, for Tank Heating

SPEED CHANGERS

See Changers, Speed, Hydraulic Coupling; Changers, Speed, Mechanical

SPEED REDUCERS

See Reducers, Speed

SPIRAL PIPE

See Pipe, Spiral, Riveted and Welded

SPOT WELDERS

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SPRAY HUMIDIFIERS

See Humidifiers, Direct, Spray Head

SPRAY NOZZLES

See Nozzles, Spray

SPRAY PAINTING BOOTHS

See Booths, Painting, Spray

SPRINKLER HEADS

See Heads, Sprinkler

SPRINKLER SYSTEM CONTROLS

See Controls, Fire Protection Sprinkler Systems; Valves, Fire Protection Sprinkler System Control

STAINLESS STEEL PIPE

See Pipe, Steel, Stainless

STAINLESS STEEL SHEETS

See Sheets, Steel, Stainless

STANDS, PIPE VISE

American Pipe Tool Co., Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Armstrong Mfg. Co., Bridgeport, Conn.
Crown Die & Tool Co., Chicago, Ill.
Martin & Sons, H. P., Owensboro, Ky.
Nye Tool Co., Chicago, Ill.
Oster Mfg. Co. Cleveland, O.
● Ridge Tool Co., Elyria, O.
Western Wire Products Co., St. Louis, Mo.
Williams & Co., J. H., Buffalo, N. Y.

STARTERS, MOTOR

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STEAM BOOSTER COMPRESSORS

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STEAM ENGINES

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STEAM JET HEATERS

See Heaters, Steam Jet, for Liquids

STEAM JET REFRIGERATION

See Compressors, Refrigerating, Steam Jet

STEAM PRESSURE REGULATORS

See Valves, Pressure Reducing and Regulating

STEAM PUMPS

See Pumps, Steam

STEAM SEPARATORS

See Separators, Steam and Oil

STEAM TRAPS

See Traps, Steam

STEEL PIPE

See Pipe, Steel

STEEL TUBE FITTINGS, FLARED

See Fittings, Steel Tube, Flared

STEEL TUBING

See Tubing, Steel

STEEL UNIONS

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STEEL VALVES

See Valves, Gate; and Valves, Globe

STERILIZING LAMPS

See Lamps, Sterilizing, for Duct Installation

STERILIZING UNITS

See Units, Sterilizing, Air

STOCKS AND DIES

- American Pipe Tool Co., Chicago, Ill.
- Armstrong Bros. Tool Co., Chicago, Ill.
- Armstrong Mfg. Co., Bridgeport, Conn.
- Beaver Pipe Tools, Inc., Warren, O.
- Champion Blower & Forge Co., Lancaster, Pa.
- Crown Die & Tool Co., Chicago, Ill. (Pipe)
- Erie Tool Wks., Erie, Pa.
- Greenfield Tap & Die Corp., Greenfield, Mass.
- Hollands Mfg. Co., Erie, Pa.
- Nye Tool Co., Chicago, Ill.
- Oster Mfg. Co., Cleveland, O.
- ● Ridge Tool Co., Elyria, O.
- Threadwell Tap & Die Co., Greenfield, Mass.
- Toledo Pipe Threading Machine Co., Toledo, O.
- V-Mac Industries, Guilford, Conn.

STOKERS, INDUSTRIAL AND COMMERCIAL

61 to 1200 Lb per Hr

- Allington & Curtis Mfg. Co., Saginaw, Mich. (For shavings, chips and sawdust)
- American Coal Burner Co., Chicago, Ill.
- American Engineering Co., Philadelphia, Pa.
- Auburn Burner Co., Auburn, Ind.
- Auburn Foundry, Inc., Stoker Div., Auburn, Ind.
- Automatic Firing Corp., St. Louis, Mo.
- Babcock & Wilcox Co., New York, N. Y.
- Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
- ● Brownell Co., The, Dayton, O.
- Burke Stoker & Mfg. Co., Chicago, Ill.
- Canton Stoker Corp., Canton, O.
- Carnes, Inc., John R., Lima, O.
- Carpenter Heating & Stoker Co., Cleveland, O.
- Central Rubber & Steel Corp., Findlay, O.
- Clizbe Bros. Mfg. Co., Plymouth, Ind.
- Combustion Engineering-Superheater, Inc., New York, N. Y.
- Conco Engineering Works, Div. of H. D. Conkey & Co., Mendota, Ill.
- ● Detroit Stoker Co., Detroit, Mich.
- Diamond Iron Works, Inc., Minneapolis, Minn.
- Econocol Stoker Div. of Cotta Transmission Co., Rockford, Ill.
- Eddy Stoker Corp., Chicago, Ill.
- Erie City Iron Works, Erie, Pa.
- Fairbanks, Morse & Co., Chicago, Ill.
- Fire-King Stoker Co., Indianapolis, Ind.
- Firemood Machine Wks., Converse, Ind.
- Flynn & Emrich Co., Baltimore, Md.
- Frederick Iron & Steel Inc., Frederick, Md.
- Freeman Stoker Div., Illinois Iron & Bolt Co., Chicago, Ill.
- Fuel Savers, Inc., Harrisburg, Pa.
- General Machinery Co., Spokane, Wash.
- Gross-Aire Mfg. Co., Overland, Mo.
- Gunnite Foundries Corp., Rockford, Ill. (Screws)
- Heating Assurance, Inc., Spokane, Wash.
- Her-Born Engrg. & Mfg. Co., Sandusky, O.
- Hershey Machine & Foundry Co., Motorstoker Div., Manheim, Pa.
- Hoffman Combustion Engineering Co., Detroit, Mich.
- Holcomb & Hoke Mfg. Co., Inc., Indianapolis, Ind.
- International Engineering Wks., Inc., Framingham, Mass.
- Iron Fireman Mfg. Co., Cleveland, O.
- Johnston & Jennings Co., Cleveland, O.
- Kingston Products Corp., Kokomo, Ind.
- Kol-Master Corp., Oregon, Ill.
- Laclede Stoker Co., St. Louis, Mo.
- Leffel & Co., James, Springfield, O.
- Loyal Knight Stokers, Inc., Belleville, Ill.
- Mallory Sales Co., Dolton, Ill.
- Meyer Furnace Co., The, Peoria, Ill.
- Muncie Gear Wks., Inc., Muncie, Ind.
- National Steam Pump Co., Upper Sandusky, O.
- Newcomb-Detroit Co., Detroit, Mich.
- Northern Steel & Stoker Corp., Peoria, Ill.
- Ormsby-Osterman, Inc., St. Louis, Mo.
- OverSpred Stoker Co., Chicago, Ill.
- Perfection Grate & Stoker Co., Springfield, Mass.
- Plymouth Industries, Inc., Plymouth, Ind.
- Pocahontas Fuel Co., Inc., Stoker Div., Cleveland, O.
- Rheem Mfg. Co., New York, N. Y.
- Riley Stoker Corp., Worcester, Mass.
- Rosedale Foundry & Machine Co., Pittsburgh, Pa.
- Scott-Newcomb, Inc., St. Louis, Mo.
- Sinker-Davis Co., Indianapolis, Ind.
- Standard Stoker Co., Inc., Erie, Pa.
- Steel Products Engineering Co., Springfield, O.
- Stokol Stoker Co., Inc., Dayton, O.
- Sun-Fire Stoker Corp., New Albany, Ind.
- Timken Silent Automatic Div., Timken-Detroit Axle Co., Jackson, Mich.
- U. S. Machine Corp., Lebanon, Ind.
- Whiting Fire Power Products Corp., Superior, Wis.
- Whitty Co., Inc., Boston, Mass. (Bituminous)
- Will-Burt Co., The, Orrville, O.

STONEWARE PIPE

See Pipe, Stoneware

STORAGE WATER HEATERS

See Heaters, Water, Steam, Storage

STRAINERS, PIPE LINE

- ● Alco Valve Co., St. Louis, Mo.
- Altens Foundry & Machine Works, Inc., Lancaster, O.
- ● American District Steam Co., North Tonawanda, N. Y.
- Aminco Refrigeration Products Co., Detroit, Mich.
- Andale Co., Philadelphia, Pa.
- ● Anderson Co., V. D., The, Cleveland, O.
- ● Armstrong Machine Wks., Three Rivers, Mich.
- ● Barnes & Jones, Inc., Boston, Mass. (steam and water only)
- Barrett, Haentjens & Co., Hazleton, Pa.
- ● Bishop & Babcock Mfg. Co., Cleveland, O.
- Blackburn-Smith Mfg. Co., Hoboken, N. J.
- Blackmer Pump Co., Grand Rapids, Mich.
- Bowser, Inc., Fort Wayne, Ind.
- Boylston Steam Specialty Co., Chicago, Ill.
- ● Cash Co., A. W., Decatur, Ill.
- Cash Valve Mfg. Co., A. W., Decatur, Ill.
- Cashin Co., W. D., Boston, Mass.
- Caton Co., Newark, N. J.
- Clark Mfg. Co., Cleveland, O.
- Cooper Co., Clark, Palmyra, N. J.
- ● Crane Co., Chicago, Ill.
- Cuno Engineering Corp., Meriden, Conn.
- Davis Regulator Co., Chicago, Ill.
- d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
- Edward Valves, Inc., East Chicago, Ind.
- Elliott Co., Jeannette, Pa.
- ● Fisher Governor Co., Marshalltown, Ia.
- Foster Engineering Co., Newark, N. J.
- Foster Pump Works, Inc., Union, N. Y.
- ● General Controls Co., Glendale, Calif.
- Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
- Grove Regulator Co., Oakland, Calif.
- Hays Mfg. Co., Erie, Pa.
- ● Henry Valve Co., Melrose Park, Ill.
- ● Hoffman Specialty Co., Indianapolis, Ind.
- Hubbell Corp., Chicago, Ill.
- ● Illinois Engineering Co., Chicago, Ill.
- Keckley Co., O. C., Chicago, Ill.
- Kerotest Mfg. Co., Pittsburgh, Pa.
- Kieley & Mueller, Inc., North Bergen, N. J.
- Kinney Mfg. Co., Boston, Mass.
- Kraissl Co., Inc., The, Hackensack, N. J.
- Leslie Co., Lyndhurst, N. J.

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Madden Brass Products Co., The, Chicago, Ill.
● Maid-O'-Mist, Inc., Chicago, Ill.
● Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Monarch Mfg. Wks., Inc., Philadelphia, Pa.
Mueller Brass Co., Port Huron, Mich.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Long Island City, N. Y.
Newark Wire Cloth Co., Newark, N. J.
● Nicholson & Co., W. H., Wilkes-Barre, Pa.
OPW Corp., Cincinnati, O.
Phillips & Co., H. A., Chicago, Ill.
Preferred Utilities Mfg. Corp., New York, N. Y.
Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Scientific Instrument Co., Detroit, Mich.
Sheffler-Gross Co., Philadelphia, Pa.
● Spence Engineering Co., Inc., Walden, N. Y.
Spray Engineering Co., Somerville, Mass.
● Spraying Systems Co., Bellwood, Ill.
Standard Machine & Mfg. Co., St. Louis, Mo.
Staples & Pfeiffer, San Francisco, Calif.
● Sterling, Inc., Milwaukee, Wis.
● Strong, Carlisle & Hammond Co., Cleveland, O.
● Swartwout Co., Cleveland, O.
● Trane Co., The, LaCrosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Trimount Rotary Power Co., Dedham, Mass.
Tryco Products, Inc., Westfield, Mass.
● Walworth Co., New York, N. Y.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
● Webster & Co., Warren, Camden, N. J.
Webster Electric Co., Racine, Wis. (For oil burners)
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.
Winslow Engineering Co., Oakland, Calif.
Wright-Austin Co., Detroit, Mich.
● Yarnall-Waring Co., Philadelphia, Pa.
Zurn Mfg. Co., J. A., Industrial Div., Erie, Pa.

STRESS RELIEVERS

See Preheaters and Stress Relievers, Electric, for Pipe Welds

STRIP HEATERS

See Heaters, Strip and Immersion, Electric

STRUCTURAL SHAPES

See Angles, Bars, Beams, Channels and Tees

STUD WELDERS

See Welders, Stud

SUCTION LINE HEAT EXCHANGERS

See Exchangers, Heat, Refrigerant Suction Line

SUMP PUMPS

See Pumps, Sump

SUPERHEATERS, PROCESS STEAM

Babcock & Wilcox Co., New York, N. Y.
● Bell & Gossett Co., Morton Grove, Ill.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Combustion Engineering-Superheater, Inc., New York, N. Y.
● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Edge Moor Iron Works, Inc., Edge Moor, Del.
Ewing Mfg. Co., Oklahoma City, Okla.
● Foster Wheeler Corp., New York, N. Y.
Goodyer Industries, Inc., Chicago, Ill.
Selas Corp. of America, Philadelphia, Pa.
Springfield Boiler Co., Springfield, Ill.

SURFACE, FINNED, COOLING, BRINE

● Acme Industries, Inc., Jackson, Mich.
● Aerofin Corp., Syracuse, N. Y.
● American Blower Corp., Detroit, Mich.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Bohn Aluminum & Brass Corp., Detroit, Mich.
Brown Fintube Co., The, Elyria, O.
● Bush Mfg. Co., West Hartford, Conn.
Conditionaire Unit Co., Chicago, Ill.
Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., Pittsburgh, Pa
● Doyle & Roth Mfg. Co., Brooklyn, N. Y.
Drayer & Hanson, Inc, Los Angeles, Calif.
● G. & O. Mfg. Co., New Haven, Conn.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Griscom-Russell Co., The, New York, N. Y.
● Howe Ice Machine Co., Chicago, Ill.
Industrial Mfg. & Engineering Co., Chicago, Ill.
● Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
● Marlo Coil Co., St. Louis, Mo.
● McCord Corp., Detroit, Mich.
McQuay, Inc., Minneapolis, Minn.
● Murray Mfg. Co., D. J., Wausau, Wis.
● Niagara Blower Co., New York, N. Y.
Peerless of America, Inc., Chicago, Ill.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
● Rempe Co., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.
Rome-Turney Radiator Co., Rome, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
● Super Radiator Corp., Minneapolis, Minn.
Tenney Engineering, Inc., Newark, N. J.
● Trane Co., The, LaCrosse, Wis.
● Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
Vilter Mfg. Co., Milwaukee, Wis.
Wolverine Tube Div. of Calumet and Hecla Consolidated Copper Co., Detroit, Mich.
X L Refrigerating Co., Chicago, Ill.
● York Corp., York, Pa.
● Young Radiator Co., Racine, Wis.

SURFACE, FINNED, COOLING, COLD WATER

● Acme Industries, Inc., Jackson, Mich.
● Aerofin Corp., Syracuse, N. Y.
Airtemp, Div. of Chrysler Corp., Dayton, O.
● American Blower Corp., Detroit, Mich.
American Coils Co., Newark, N. J.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Bohn Aluminum & Brass Corp., Detroit, Mich.
Brown Fintube Co., The, Elyria, O.
● Bush Mfg. Co., West Hartford, Conn.
Campbell Heating Co., E. K., Kansas City, Mo.
Chicago Fan & Fin Coil Co., Chicago, Ill.
Conditionaire Unit Co., Chicago, Ill.
Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., Pittsburgh, Pa.
● Doyle & Roth Mfg. Co., Brooklyn, N. Y.
Drayer & Hanson, Inc., Los Angeles, Calif.
Frigidaire Div., General Motors Corp., Dayton, O.
● G. & O. Mfg. Co., New Haven, Conn.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
● Governair Corp., Oklahoma City, Okla.
Griscom-Russell Co., The, New York, N. Y.
● Howe Ice Machine Co., Chicago, Ill.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
● Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Atlanta, Ga.
● Marlo Coil Co., St. Louis, Mo.
● McCord Corp., Detroit, Mich.
McQuay, Inc., Minneapolis, Minn.
● Modine Mfg. Co., Racine, Wis.
● Murray Mfg. Co., D. J., Wausau, Wis.
● Nesbitt, Inc., John J., Philadelphia, Pa.
● Niagara Blower Co., New York, N. Y.
Peerless of America, Inc., Chicago, Ill.
Pleasantaire Corp., Washington, D. C.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
● Rempe Co., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.
● Rittling Corp., The., Buffalo, N. Y.
Rome-Turney Radiator Co., Rome, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
● Super Radiator Corp., Minneapolis, Minn.
Tenney Engineering, Inc., Newark, N. J.
● Trane Co., The, LaCrosse, Wis.
● Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
● United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
● Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
● Wing Mfg. Co., L. J., New York, N. Y.
Wolverine Tube Div., Calumet & Hecla Consolidated Copper Co., Detroit, Mich.
Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
Yates-American Machine Co., Beloit, Wis.
● York Corp., York, Pa.
● Young Radiator Co., Racine, Wis.

SURFACE, FINNED, COOLING, DIRECT EXPANSION

● Acme Industries, Inc., Jackson, Mich.
● Aerofin Corp., Syracuse, N. Y.
Airtemp, Div. of Chrysler Corp., Dayton, O.
● American Blower Corp., Detroit, Mich.
American Coils Co., Newark, N. J.
Betz Corp., Hammond, Ind.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Bohn Aluminum & Brass Corp., Detroit, Mich.

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Brown Fintube Co., The, Elyria, O.
● Bush Mfg. Co., West Hartford, Conn.
Conditionaire Unit Co., Chicago, Ill.
● Doyle & Roth Mfg. Co., Brooklyn, N. Y.
Drayer & Hanson, Inc., Los Angeles, Calif.
Frigidaire Div., General Motors Corp., Dayton, O.
● G. & O. Mfg. Co., New Haven, Conn.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
● Governair Corp., Oklahoma City, Okla.
Griscom-Russell Co., The, New York, N. Y.
● Howe Ice Machine Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
● Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Atlanta, Ga.
● Marlo Coil Co., St. Louis, Mo.
● McCord Corp., Detroit, Mich.
McQuay, Inc., Minneapolis, Minn.
Merchant & Evans Co., Philadelphia, Pa.
● Modine Mfg. Co., Racine, Wis.
● Murray Mfg. Co., D. J., Wausau, Wis.
● Niagara Blower Co., New York, N. Y.
Peerless of America, Inc., Chicago, Ill.
Pleasantaire Corp., Washington, D. C.
Refrigeration Appliances Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
● Rempe Co., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.
Rome-Turney Radiator Co., Rome, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
● Super Radiator Corp., Minneapolis, Minn.
Tenney Engineering, Inc., Newark, N. J.
● Trane Co., The, LaCrosse, Wis.
● Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
● United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
● Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Wolverine Tube Div. of Calumet and Hecla Consolidated Copper Co., Detroit, Mich.
Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
Yates-American Machine Co., Beloit, Wis.
● York Corp., York, Pa.
● Young Radiator Co., Racine, Wis.

SURFACE, FINNED, HEATING, INDIRECT, FERROUS

Bayley Blower Co., Milwaukee, Wis.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Brown Fintube Co., The, Elyria, O.
● Bush Mfg. Co., West Hartford, Conn.
Campbell Heating Co., E. K., Kansas City, Mo.
Conditionaire Unit Co., Chicago, Ill.
● Doyle & Roth Mfg. Co., Brooklyn, N. Y.
Drayer & Hanson, Inc., Los Angeles, Calif.
● G. & O. Mfg. Co., New Haven, Conn.
Goodyer Industries, Inc., Chicago, Ill.
Griscom-Russell Co., The, New York, N. Y.
Industrial Mfg. & Engineering Co., Chicago, Ill.
● Modine Mfg. Co., Racine, Wis.
● Murray Mfg. Co., D. J., Wausau, Wis.
National Radiator Co., The, Johnstown, Pa.
● New York Blower Co., Chicago, Ill.
● Niagara Blower Co., New York, N. Y.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Rigidbilt Inc., Chicago, Ill.
● Rittling Corp., The, Buffalo, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
Tenney Engineering, Inc., Newark, N. J.
● Trane Co., The, LaCrosse, Wis.
● Vulcan Radiator Co., Hartford, Conn.
● Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.

SURFACE, FINNED, HEATING, INDIRECT, NON-FERROUS

● Aerofin Corp., Syracuse, N. Y.
Airtherm Mfg. Co., St. Louis, Mo.
● American Blower Corp., Detroit, Mich.
American Coils Co., Newark, N. J.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Bohn Aluminum & Brass Corp., Detroit, Mich.
Brown Fintube Co., The, Elyria, O.
● Bush Mfg. Co., West Hartford, Conn.
Campbell Heating Co., E. K., Kansas City, Mo.
Chicago Fan & Fin Coil Co., Chicago, Ill.
● Doyle & Roth Mfg. Co., Brooklyn, N. Y.
Drayer & Hanson, Inc., Los Angeles, Calif.
Frigidaire Div., General Motors Corp., Dayton, O.
● G. & O. Mfg. Co., New Haven, Conn.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
Goodyer Industries, Inc., Chicago, Ill.
● Governair Corp., Oklahoma City, Okla.
Griscom-Russell Co., The, New York, N. Y.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
● Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Atlanta, Ga.
● Marlo Coil Co., St. Louis, Mo.
● McCord Corp., Detroit, Mich.
McQuay, Inc., Minneapolis, Minn.
● Modine Mfg. Co., Racine, Wis.
● Murray Mfg. Co., D. J., Wausau, Wis.
● Nesbitt, Inc., John J., Philadelphia, Pa.
● Niagara Blower Co., New York, N. Y.
Peerless of America, Inc., Chicago, Ill.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
● Rempe Co., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.
● Rittling Corp., The, Buffalo, N. Y.
Rome-Turney Radiator Co., Rome, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
● Super Radiator Corp., Minneapolis, Minn.
Tenney Engineering, Inc., Newark, N. J.
● Trane Co., The, LaCrosse, Wis.
● Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
● United States Air Conditioning Corp., Minneapolis, Minn.
● Vulcan Radiator Co., Hartford, Conn.
● Westinghouse Electric Corp., Sturevant Div., Boston, Mass.
● Wing Mfg. Co., L. J., New York, N. Y.
Wolverine Tube Div. of Calumet and Hecla Consolidated Copper Co., Detroit, Mich.
● York Corp., York, Pa.
● Young Radiator Co., Racine, Wis.

SURFACE THERMOSTATS

See Thermostats, Surface

SWING JOINTS

See Joints, Pipe, Flexible Swing and Revolving

SWITCHES, ELECTRICAL

Acro Switch Co., Columbus, O.
Adam Electric Co., Frank, St. Louis, Mo.
Aerotec Corp., The, Greenwich, Conn.
● Allen-Bradley Co., Milwaukee, Wis.
● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Arrow-Hart & Hegeman Elect. Co., Hartford, Conn.
Automatic Switch Co., Orange, N. J.
Barber-Colman Co., Rockford, Ill.
Clark Controller Co., Cleveland, O.
Congress Fan & Electric Co., Daytona Beach, Fla.
Cooper Co., Clark, Palmyra, N. J.
Crise Mfg. Co., The, Columbus, O.
Cutler-Hammer, Inc., Milwaukee, Wis.
Defender Instrument & Regulator Co., St. Louis, Mo.
Delta-Star Electric Co., Chicago, Ill.
Electric Controller & Mfg. Co., Cleveland, O.
Electric Machinery Mfg. Co., Minneapolis, Minn.
Electro-Switch & Controls, Inc., Culver City, Calif.
● General Controls Co., Glendale, Calif.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Guardian Electric Mfg. Co., Chicago, Ill.
Hart Mfg. Co., Hartford, Conn.
● McDonnell & Miller, Inc., Chicago, Ill.
● Mercoid Corp., Chicago, Ill.
Micro Switch Div. of First Industrial Corp., Freeport, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Monitor Controller Co., The., Boston, Mass.
Morse-Smith-Morse, Inc., Watertown, Mass.
National Acme Co., The, Cleveland, O.
Penn Electric Switch Co., Goshen, Ind.
Soreng Mfg. Co., Schiller Park, Ill.
Square D Co., Detroit, Mich.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Struthers-Dunn, Inc., Philadelphia, Pa.
Thermix Corp., The, Greenwich, Conn.
Tork Clock Co., Inc., Mount Vernon, N. Y.
Trumbull Electric Mfg. Co., The, Plainville, Conn.
Walton Co., Hartford, Conn. (Foot)
● Ward Leonard Electric Co., Mount Vernon, N. Y.
● Westinghouse Electric Corp., Pittsburgh, Pa.
White Mfg. Co., St. Paul, Minn.
White-Rodgers Electric Co., St. Louis, Mo.
Zenith Electric Co., Chicago, Ill.

SWITCHES, FLOAT, REFRIGERATION

● Alco Valve Co., St. Louis, Mo.
Arrow-Hart & Hegeman Elect. Co., Hartford, Conn.
Clark Controller Co., Cleveland, O.
● Frick Co., Waynesboro, Pa.
Magnetrol, Inc., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
● Mercoid Corp., The, Chicago, Ill.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Thermix Corp., The, Greenwich, Conn.

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SWITCHES, FLOW

Cooper Co., Clark, Palmyra, N. J.
Coral Designs, Forest Hills, N. Y.
Drying Systems, Inc., Chicago, Ill.
Fischer & Porter Co., Hatboro, Pa.
● General Controls Co., Glendale, Calif.
Magnetrol, Inc., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
Shallcross Controls, Inc., Milwaukee, Wis.
Thermix Corp., The, Greenwich, Conn.

SWITCHES, LIQUID LEVEL

● Alco Valve Co., St. Louis, Mo.
● Allen-Bradley Co., Milwaukee, Wis.
Arrow-Hart & Hegeman Elect. Co., Hartford, Conn.
Automatic Control Co., St. Paul, Minn.
B/W Controller Corp., Birmingham, Mich.
Bennett Oil Co., Omaha, Neb.
Cissell Mfg. Co., Inc., W. M., Louisville, Ky.
Cook Electric Co., Diaphlex Div., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Coral Designs, Forest Hills, N. Y.
Cutler-Hammer, Inc., Milwaukee, Wis.
Defender Instrument & Regulator Co., St. Louis, Mo.
● Detroit Lubricator Co., Detroit, Mich.
Fischer & Porter Co., Hatboro, Pa.
● General Controls Co., Glendale, Calif.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Healy Ruff Co., St. Paul, Minn.
Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Magnetrol Inc., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
● Mercoid Corp., Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Monitor Controller Co., The, Boston, Mass.
Newark Boiler Regulator Co., Inc., Bloomfield, N. J.
Penn Electric Switch Co., Goshen, Ind.
Photoswitch, Inc., Cambridge, Mass.
Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
● Stephens-Adamson Mfg. Co., Aurora, Ill.
Thermix Corp., The, Greenwich, Conn.
United Cinephone Corp., Torrington, Conn.
● Westinghouse Electric Corp., Pittsburgh, Pa.

SWITCHES, MERCURY

Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Durakool, Inc., Elkhart, Ind.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
● Mercoid Corp., Chicago, Ill.
Mercontrol Inc., New York, N. Y.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Newark Boiler Regulator Co., Inc., Bloomfield, N. J.
Potter & Brumfield Sales Co., Princeton, Ind.
● Westinghouse Electric Corp., Pittsburgh, Pa.

SWITCHES, PRESSURE AND VACUUM

Aerotec Corp., The, Greenwich, Conn.
● Allen-Bradley Co., Milwaukee, Wis.
● Autempco Corp., New York, N. Y.
Automatic Control Co., St. Paul, Minn.
Barber-Colman Co., Rockford, Ill.
Clark Controller Co., Cleveland, O.
Cook Electric Co., Diaphlex Div., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Cutler-Hammer, Inc., Milwaukee, Wis.
Defender Instrument & Regulator Co., St. Louis, Mo.
● Detroit Lubricator Co., Detroit, Mich.
● General Controls Corp. Glendale, Calif.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Giannini & Co., Inc., G. M., Pasadena, Calif.
Gleason-Avery, Inc., Auburn, N. Y.
Healy Ruff Co., St. Paul, Minn.
Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
McQuay-Norris Mfg. Co., St. Louis, Mo.
Meletron Corp., Los Angeles, Calif.
● Mercoid Corp., Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Monitor Controller Co., The., Boston, Mass.
Newark Boiler Regulator Co., Inc., Bloomfield, N. J.
Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Ranco, Inc., Columbus, O.
Sampsel Time Control, Inc., Spring Valley, Ill.
Saval Inc., Los Angeles, Calif.
Shallcross Controls, Inc., Milwaukee, Wis.
Skaneateles Mfg. Co., Inc., Syracuse, N. Y.
Soreng Mfg. Co., Schiller Park, Ill.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Thermix Corp., The, Greenwich, Conn.
United States Gauge Div. of American Machine & Metals, Inc., Sellersville, Pa.
● Westinghouse Electric Corp., Pittsburgh, Pa.
● White-Rodgers Electric Co., St. Louis, Mo.

SWITCHES, TIME

● Allen-Bradley Co., Milwaukee, Wis.
American Gas Accumulator Co., Elizabeth, N. J.
● Autempco Corp., New York, N. Y.
Automatic Devices Co., Inc., Chicago, Ill.
Automatic Electric Mfg. Co., Mankato, Minn.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Barber-Colman Co., Rockford, Ill.
Cooper Co., Clark, Palmyra, N. J.
Cramer Co., Inc., R. W., The, Centerbrook, Conn.
Electric Switch & Controls, Inc., Culver City, Calif.
● General Controls Corp., Glendale, Calif.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Gleason-Avery, Inc., Auburn, N. Y.
Hansen Mfg. Co., Princeton, Ind. (timing motors and time machine)
Haydon Mfg. Co., Inc., Sub. General Time Instruments Corp., Torrington, Conn.
Healy Ruff Co., St. Paul, Minn.
Heat Timer Corp., New York, N. Y.
Holcomb & Hoke Mfg. Co., Inc., Indianapolis, Ind.
Industrial Engineering Corp., Terre Haute, Ind.
International Register Co., Chicago, Ill.
Landis & Gyr, Inc., New York, N. Y.
● Mercoid Corp., Chicago, Ill.
Miller-Harris Instrument Co., Milwaukee, Wis.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
National Time & Signal Corp., Detroit, Mich.
Paragon Electric Co., Two Rivers, Wis.
Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Photoswitch, Inc., Cambridge, Mass.
Potter & Brumfield Sales Co., Princeton, Ind.
Reliance Automatic Lighting Co., Racine, Wis.
Reynolds Electric Co., River Grove, Ill.
Rhodes, Inc., M. H., Hartford, Conn.
Ripley Co., Inc., L-R Blower Div., Middletown, Conn.
Sampsel Time Control, Inc., Spring Valley, Ill.
Sangamo Electric Co., Springfield, Ill.
Telechron, Inc., Ashland, Mass.
Tork Clock Co., Inc., Mount Vernon, N. Y.
● Ward Leonard Electric Co., Mount Vernon, N. Y.
● Westinghouse Electric Corp., Pittsburgh, Pa.
● White-Rodgers Electric Co., St. Louis, Mo.
Zenith Electric Co., Chicago, Ill.

SWIVEL PIPE COUPLINGS

See Joints, Pipe, Flexible Swing and Revolving

SYSTEMS, COMBUSTION CONTROL

Askania Regulator Co., Chicago, Ill.
Bailey Meter Co., Cleveland, O.
Bowser, Inc., Fort Wayne, Ind.
Bristol Co., Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
● Cash Co., A. W., Decatur, Ill.
● Combustion Control Corp., Cambridge, Mass.
Defender Instrument & Regulator Co., St. Louis, Mo.
Engineer Co., New York, N. Y.
Ess Instrument Co., Bergenfield, N. J.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
General Power Plant Corp., New York, N. Y.
Hagan Corp., Pittsburgh, Pa.
● Hays Corp., Michigan City, Ind.
● Illinois Engineering Co., Chicago, Ill.
● Mercoid Corp., Chicago, Ill.
Perfex Corp., Milwaukee, Wis.
Republic Flow Meters Co., Chicago, Ill.
Selas Corp. of America, Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Tork Clock Co., Mount Vernon, N. Y.

SYSTEMS, CONDENSATE RETURN

Acker Organization, Inc., W. M., Cleveland, O.
● Barnes & Jones, Inc., Boston, Mass.
Dutton Co., C. H., Kalamazoo, Mich.
Jacuzzi Bros., Inc., Richmond, Calif.
Oilux Co., Fort Wayne, Ind.
Roth Co., Roy E., Rock Island, Ill.
Sterling Engineering & Mfg. Corp., Hyde Park, Mass.
Templeton Bros., Hyde Park, Mass.

SYSTEMS, ELECTRIC PIPE HEATING

Fluid Systems, Inc., New Haven, Conn.

SYSTEMS, HEATING, HOT WATER

● Bell & Gossett Co., Morton Grove, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.

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● Gold Top Heating, Inc., Butte, Mont.
● Hoffman Specialty Co., Indianapolis, Ind.
Hook & Ackerman, Inc., New York, N. Y.
Kainer & Co., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
● Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
Preferred Utilities Mfg. Corp., New York, N. Y.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
● Surface Combustion Corp., Toledo, O.
Taco Heaters, Inc., Providence, R. I.
● Thrush & Co., H. A. Peru, Ind.
● Trane Co., The, La Crosse, Wis.
Triplex Heating Speciality Co., Inc., Peru, Ind.
W-H Engineering Co., Chicago, Ill.
● Webster & Co., Warren, Camden, N. J.

SYSTEMS, HEATING, VACUUM

Anderson Products, Inc., Cambridge, Mass.
● Barnes & Jones, Inc., Boston, Mass.
Cashin Co., W. D., Boston, Mass.
● Dunham Co., C. A., Chicago, Ill.
● Hoffman Specialty Co., Indianapolis, Ind.
● Illinois Engineering Co., Chicago, Ill.
● Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
Monash-Younker Co., Inc., Chicago, Ill.
Mouat Vapor Heating Co., The, Cleveland, O.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
● Sterling, Inc., Milwaukee, Wis.
Stickle Steam Specialties Co., Indianapolis, Ind.
● Trane Co., The, La Crosse, Wis.
● Webster & Co., Warren, Camden, N. J.
● Whittington Pump & Engineering Corp., Indianapolis, Ind.

SYSTEMS, HEATING, VAPOR

● American District Steam Co., North Tonawanda, N. Y.
● Barnes & Jones, Inc., Boston, Mass.
Cashin Co., W. D., Boston, Mass.
● Dunham Co., C. A., Chicago, Ill.
Gorton Heating Corp., Cranford, N. J.
● Hoffman Specialty Co., Indianapolis, Ind.
● Illinois Engineering Co., Chicago, Ill.
● Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
Monash-Younker Co., Inc., Chicago, Ill.
Mouat Vapor Heating Co., The, Cleveland, O.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
● Sterling, Inc., Milwaukee, Wis.
● Trane Co., The, La Crosse, Wis.
Vapor Specialty Co., New York, N. Y.
● Webster & Co., Warren, Camden, N. J.

SYSTEMS, HEATING, ZONE CONTROL

Armstrong Control Co., Inc., Portland, Ore.
● Autempco Corp., New York, N. Y.
Automatic Devices Co., Inc., Chicago, Ill.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Barber-Colman Co., Rockford, Ill.
● Barnes & Jones, Inc., Boston, Mass.
● Bell & Gossett Co., Morton Grove, Ill.
● Dunham Co., C. A., Chicago, Ill.
● Gold Top Heating, Inc., Butte, Mont.
Heat Timer Corp., New York, N. Y.
● Hoffman Specialty Co., Indianapolis, Ind.
● Illinois Engineering Co., Chicago, Ill.
● Johnson Service Co., Milwaukee, Wis.
● Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
● Mercoid Corp., Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
Simplex Heating Specialty Co., Inc., Lynchburg, Va.
Tallmadge & Co., Webster, East Orange, N. J.
● Thrush & Co., H. A., Peru, Ind.
● Trane Co., The, La Crosse, Wis.
W-H Engineering Co., Chicago, Ill.
● Webster & Co., Warren, Camden, N. J.
Wheelco Instruments Co., Chicago, Ill.
Zone-Heat Regulator Co., Garrettsville, O.

SYSTEMS, HOT GAS DEFROSTING, FOR REFRIGERATION

Patterson-Kelly Co., Inc., The, East Stroudsburg, Pa.
Tenney Engineering, Inc., Newark, N. J.
Penn Electric Switch Co., Goshen, Ind.

SYSTEMS, PROCESS HEATING, HIGH TEMPERATURE

● Air Devices, Inc., New York, N. Y.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Dow Chemical Co., The, Midland, Mich.
Dravo Corp., Pittsburgh, Pa.
Drying Systems, Inc., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Goodyer Industries, Inc., Chicago, Ill.
● Illinois Engineering Co., Chicago, Ill.
Mitchell & Co., Inc., W. K., Philadelphia, Pa.
Parks-Cramer Co., Fitchburg, Mass.
Peabody Engineering Corp., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
Selas Corp. of America, Philadelphia, Pa.
St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
● Trane Co., The, La Crosse, Wis.
Trent, Inc., Philadelphia, Pa.
● Wing Mfg. Co., L. J., New York, N. Y.

SYSTEMS, ROOF SPRAYING (FOR COOLING ROOFS)

● April Showers Co., Inc., Washington, D. C.
Goettl Bros. Metal Prod., Inc., Phoenix, Ariz.
● Marley Co., Inc., The, Kansas City, Kan.
Rockwood Sprinkler Co., Worcester, Mass.
Ross Sprinkler Co., Pasadena, Calif.
Ruppright, Siegfried, Los Angeles, Calif.
Skinner Irrigation Co., Troy, O.
Spray Engineering Co., Somerville, Mass.
● Spraying Systems Co, Bellwood, Ill.
Thermal Industries, Indio, Calif.
Water Cooling Corp., New York, N. Y.

TANK HEADS

See Parts, for Heating and Air Conditioning Equipment

TANKS, EXPANSION, FOR HOT WATER HEATING SYSTEMS

● Bell & Gossett Co., Morton Grove, Ill.
Biggs Boiler Works Co., E. Akron, O.
Birchfield Boiler, Inc., Tacoma, Wash.
Buffalo Tank Corp., Newark, N. J.
Caldwell Co., W. E., Louisville, Ky.
Case & Son Mfg. Co., W. A., Buffalo, N. Y.
Cincinnati Metalcrafts Inc., Cincinnati, O.
● General Oil Burner Corp., Baltimore, Md.
Kehm Corp., The, Chicago, Ill.
Koven & Bro., Inc., L. O., Jersey City, N. J.
Maysteel Products, Inc., Milwaukee, Wis.
Quaker City Iron Wks., Philadelphia, Pa.
Rheem Mfg. Co., New York, N. Y.
Scaife Co., Oakmont, Pa.
Taco Heaters, Inc., Providence, R. I.
● Thrush & Co., H. A., Peru, Ind.
● Trane Co., The, La Crosse, Wis.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Western Blower Co., Seattle, Wash.
Wheeling Steel Corp., Wheeling, W. Va.
Wood Mfg. Co., Inc., John, Conshohocken, Pa.

TANKS, PROCESS AND STORAGE

Aeroil Products Co., Inc., South Hackensack, N. J.
Aluminum Co. of America, Pittsburgh, Pa.
American Car & Foundry Co., New York, N. Y.
American Hard Rubber Co., New York, N. Y. (Rubber lined)
American Pipe & Steel Corp., Alhambra, Calif.
American Shipbuilding Co., Cleveland, O.
Armco Drainage & Metal Products, Inc., Middletown, O.
● Bell & Gossett Co., Morton Grove, Ill.
Bigelow Co., New Haven, Conn.
Biggs Boiler Wks. Co., E. Akron, O.
Birchfield Boiler, Inc., Tacoma, Wash.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Buffalo Tank Corp., Newark, N. J.
Caldwell Co., W. E., Louisville, Ky.
Case & Son Mfg. Co., W. A., Buffalo, N. Y.
Chicago Bridge & Iron Co., Chicago, Ill.
Chicago Steel Tank Co., Chicago, Ill.
Cincinnati Metalcrafts Inc., Cincinnati, O.
Columbian Steel Tank Co., Kansas City, Mo.
● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Connery Construction Co., Philadelphia, Pa.
Dahlquist Mfg. Co., Div. of Process Engineering Inc., Somerville, Mass.
Day Co., The, Minneapolis, Minn.
Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., Pittsburgh, Pa
Dillon Steam Boiler Wks., Inc., D. M., Fitchburg, Mass.
Downingtown Iron Works, Downingtown, Pa.
Eclipse Fuel Engineering Co., Rockford, Ill.
Elastic Porcelain Lining Corp., Rochester, N. Y. (Tank linings)
Falstrom Co., Passaic, N. J.
Farrar & Trefts, Buffalo, N. Y.
Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
● Frick Co., Waynesboro, Pa.
Gehri Co., Tacoma, Wash.

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General Ceramics & Steatite Corp., Keasbey, N. J. (chemical stoneware & porcelain)
Gerstein & Cooper, Inc., South Boston, Mass.
Goettl Bros. Metal Prod., Inc., Phoenix, Ariz.
Goodrich Co., B. F., Akron, O. (Rubber lined)
Graver Tank & Mfg. Co., Inc., East Chicago, Ind.
Haveg Corp., Newark, Del.
Heat Transfer Products, Inc., Carbondale, Pa.
Hodge Boiler Works, East Boston, Mass.
Illinois Oil Products, Inc., Rock Island, Ill.
International Boiler Wks., East Stroudsburg, Pa.
Kirk & Blum Mfg. Co., Cincinnati, O.
Knight, Maurice A., Akron, O.
Kopperman & Sons, Joseph, Philadelphia, Pa.
Koven & Bro., Inc., L. O., Jersey City, N. J.
Lead Lined Iron Pipe Co., Wakefield, Mass.
Littleford Bros. Inc., Cincinnati, O.
Lumm Co., A. H., Toledo, O.
Manitowoc Engineering Wks., Manitowoc, Wis.
Maysteel Products, Inc., Milwaukee, Wis.
Mesker Steel Corp., Geo. L., Evansville, Ind.
Murray Iron Wks. Co., Burlington, Ia.
National Lead Co., New York, N. Y.
● National Metal Fabricators, Chicago, Ill.
National Radiator Co., The, Johnstown, Pa.
Newcomb-Detroit Co., Detroit, Mich.
Nooter Boiler Works Co., John, St. Louis, Mo.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Pittsburgh Plate Glass Co., Pittsburgh, Pa. (glass)
Quaker City Iron Wks., Philadelphia, Pa.
Reco Products Div., Refrigeration Engineering Corp., Philadelphia, Pa.
Rheem Mfg. Co., New York, N. Y.
Richmond Engineering Co., Inc., Richmond, Va.
Roessing Mfg. Co., Pittsburgh, Pa.
Rosebraugh Co., W. W., Salem, Ore.
Roth Co., Roy E., Rock Island, Ill.
Santa Fe Tank & Tower Co., Los Angeles, Calif.
Scaife Co., Oakmont, Pa.
Sims Co., Erie, Pa.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Struthers Wells Corp., Titusville, Pa.
Tippett & Wood, Phillipsburg, N. J.
Trageser Copper Wks., Inc., Maspeth, Long Island, N. Y.
United States Rubber Co., New York, N. Y.
United States Stoneware Co., New York, N. Y.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Vesco Corp., New York, N. Y.
Walsh-Holyoke Steam Boiler Co., Holyoke, Mass.
Western Blower Co., Seattle, Wash.
● Whitlock Mfg. Co., Hartford, Conn.
Wood Mfg. Co., Inc., John, Conshohocken, Pa.

TAPE, INDUSTRIAL, ADHESIVE

Irvington Varnish & Insulator Co., Irvington, N. J.
Minneapolis Mining & Mfg. Co., St. Paul, Minn.
● Polyken Industrial Tape Dept., Bauer & Black, Div. of the Kendall Co., Chicago, Ill.
Seamless Rubber Co., Industrial Tape Div., New Haven, Conn.
United States Rubber Co., New York, N. Y.

TEMPERATURE AND HUMIDITY CONTROLS

See Humidistats; Recorder-Controllers; Thermostats

TEMPERATURE RECORDERS

See Recorders, Temperature

TEMPERATURE REGULATORS

See Regulators, Temperature

TEMPLATES, DRAWING, PIPING

Dietzgen Co., Eugene, Chicago, Ill.

TEST CHAMBERS

See Chambers, Test, Controlled Temperature and Humidity

TESTERS, GAGE, DEAD WEIGHT

Ashton Valve Co., Cambridge, Mass.
Dillon Co., Inc., W. C., Chicago, Ill.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Mansfield & Green, Cleveland, O.

THERMOMETERS, INDICATING, INDUSTRIAL

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Dillon Co., Inc., W. C., Chicago, Ill.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Equipoise Controls, Mount Vernon, N. Y.
Foxboro Co., Foxboro, Mass.
G. M. Mfg. Co., New York, N. Y.
Garden City Instruments, Inc., Chicago, Ill.
Gotham Instrument Co., Inc., New York, N. Y.
H-B Instrument Co., Philadelphia, Pa.
Hill, E. Vernon & Co., Chicago, Ill.
● Illinois Testing Laboratories, Inc., Chicago, Ill.
Instrument Associates, Inc., Brooklyn, N. Y.
● Johnson Service Co., Milwaukee, Wis.
Leeds & Northrup Co., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Marsh Corp., Jas. P., Skokie, Ill.
Marshalltown Mfg. Co., Marshalltown, Ia.
Moeller Instrument Co., Richmond Hill, N. Y.
Palmer Thermometers, Inc., Cincinnati (Norwood), O.
Philadelphia Thermometer Co., Philadelphia, Pa.
● Powers Regulator Co., Chicago, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.
Rochester Mfg. Co., Rochester, N. Y.
Scientific Instrument Co., Detroit, Mich.
Standard Thermometer, Inc., Boston, Mass.
Tagliabue Corp., C. J., Newark, N. J.
● Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
United States Gauge Div. of American Machine & Metals, Inc., Sellersville, Pa.
Weksler Thermometer Corp., New York, N. Y.
Weston Electrical Instrument Corp., Newark, N. J.
Wheelco Instruments Co., Chicago, Ill.

THERMOMETERS, INDICATING, REMOTE-READING

Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Defender Instrument & Regulator Co., St. Louis, Mo.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Fee & Stemwedel, Inc., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
G. M. Mfg. Co., New York, N. Y.
Gotham Instrument Co., Inc., New York, N. Y.
H-B Instrument Co., Philadelphia, Pa.
Hotstream Heater Co., Cleveland, O.
● Illinois Testing Laboratories, Inc., Chicago, Ill.
● Johnson Service Co., Milwaukee, Wis.
Leeds & Northrup Co., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Marsh Corp., Jas. P., Skokie, Ill.
Marshalltown Mfg. Co., Marshalltown, Ia.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Moeller Instrument Co., Richmond Hill, N. Y.
Moore Products Co., Philadelphia, Pa.
Palmer Thermometers, Inc., Cincinnati (Norwood), O.
Philadelphia Thermometer Co., Philadelphia, Pa.
● Powers Regulator Co., Chicago, Ill.
Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.
Rochester Mfg. Co., Rochester, N. Y.
● Sarco Co., Inc., New York, N. Y.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Corp., C. J., Newark, N. J.
● Taylor Instrument Companies, Rochester, N. Y.
Thompson Research & Mfg. Co., Davenport, Fla.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
United States Gauge Div. of American Machine & Metals, Inc., Sellersville, Pa.
Weksler Thermometer Corp., New York, N. Y.
Weston Electrical Instrument Corp., Newark, N. J.

THERMOMETERS, INDICATING, WALL

Bristol Co., The, Waterbury, Conn.
Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Fee & Stemwedel, Inc., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
G. M. Mfg. Co., New York, N. Y.
Gotham Instrument Co., Inc., New York, N. Y.
H-B Instrument Co., Philadelphia, Pa.
Hausman Mfg. & Sales Co., Chicago, Ill. (Indicates both temperature and humidity, showing comfort zone)
Hill, E. Vernon & Co., Chicago, Ill.
● Illinois Testing Laboratories, Inc., Chicago, Ill.
Leeds & Northrup Co., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Marsh Corp., Jas. P., Skokie, Ill.
Moeller Instrument Co., Richmond Hill, N. Y.
Palmer Thermometers, Inc., Cincinnati (Norwood), O.
Philadelphia Thermometer Co., Philadelphia, Pa.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.

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● Sarco Co., Inc., New York, N. Y.
Scientific Instrument Co., Detroit, Mich.
Standard Thermometer, Inc., Boston, Mass.
Tagliabue Corp., C. J., Newark, N. J.
● Taylor Instrument Companies, Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
United States Gauge Div. of American Machine & Metals, Inc., Sellersville, Pa.
Weksler Thermometer Corp., New York, N. Y. (Effective temperature indicator)
Weston Electrical Instrument Corp., Newark, N. J.
Wheelco Instruments Co., Chicago, Ill.

THERMOMETERS, KATA

G. M. Mfg. Co., New York, N. Y.
Hill, E. Vernon & Co., Chicago, Ill.
Palmer Thermometers, Inc., Cincinnati (Norwood), O.
Precision Thermometer & Instrument Co., Philadelphia, Pa.

THERMOSTATIC BELLOWS

See Bellows, Thermostatic and Metallic

THERMOSTATIC BI-METALS

See Bi-Metals, Thermostatic

THERMOSTATIC TRAPS

See Traps, Steam, Thermostatic

THERMOSTATS, DUCT TYPE

American District Telegraph Co., New York, N. Y.
Armstrong Control Co., Inc., Portland, Ore.
Atlas Valve Co., Newark, N. J.
● Autempco Corp., New York, N. Y.
Barber-Colman Co., Rockford, Ill.
Burling Instrument Co., Newark, N. J.
Cam-Stat, Inc., Div. of The Paul Henry Co., Los Angeles, Calif.
Cooper Co., Clark, Palmyra, N. J.
Douglass Automatic Controls Co., South Gate, Calif.
Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.
Fenwal, Inc., Ashland, Mass.
● Johnson Service Co., Milwaukee, Wis.
Leslie Co., Lyndhurst, N. J.
Mechanical Industries Production Co., Akron, O.
● Mercoid Corp., The, Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Moeller Instrument Co., Richmond Hill, N. Y.
Perfex Corp., Milwaukee, Wis.
Philadelphia Thermometer Co., Philadelphia, Pa.
● Powers Regulator Co., Chicago, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
Stevens Mfg. Co., Inc., Mansfield, O.
Tallmadge & Co., Webster, East Orange, N. J.
Thermac Co., Los Angeles, Calif.
United Electric Controls Co., Watertown, Mass.
Vapor Heating Corp., Chicago, Ill.
● White-Rodgers Electric Co., St. Louis, Mo.

THERMOSTATS, EFFECTIVE TEMPERATURE

Barber-Colman Co., Rockford, Ill.
Cooper Co., Clark, Palmyra, N. J.
● Illinois Engineering Co., Chicago, Ill.
● Johnson Service Co., Milwaukee, Wis.
● Powers Regulator Co., Chicago, Ill.
● Sarcotherm Controls, Inc., New York, N. Y.

THERMOSTATS, IMMERSION

Armstrong Control Co., Inc., Portland, Ore.
● Armstrong Machine Wks., Three Rivers, Mich.
Atlas Valve Co., Newark, N. J.
● Autempco Corp., New York, N. Y.
Barber-Colman Co., Rockford, Ill.
Burling Instrument Co., Newark, N. J.
Cam-Stat, Inc., Div. of The Paul Henry Co., Los Angeles, Calif.
Cooper Co., Clark, Palmyra, N. J.
● Detroit Lubricator Co., Detroit, Mich.
Douglass Automatic Controls Co., South Gate, Calif.
Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.
Fenwal, Inc., Ashland, Mass.
● General Controls Co., Glendale, Calif.
H-B Instrument Co., Philadelphia, Pa.
Hart Mfg. Co., Hartford, Conn.
Industrial Engineering Corp., Terre Haute, Ind.
● Johnson Service Co., Milwaukee, Wis.
Leslie Co., Lyndhurst, N. J.
Mechanical Industries Production Co., Akron, O.
● Mercoid Corp., The, Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Philadelphia Thermometer Co., Philadelphia, Pa.
● Powers Regulator Co., Chicago, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass.
Thermac Co., Los Angeles, Calif.
Thwing-Albert Instrument Co., Philadelphia, Pa.
United Electric Controls Co., Watertown, Mass.
Vapor Heating Corp., Chicago, Ill.
White Mfg. Co., St. Paul, Minn.
● White-Rodgers Electric Co., St. Louis, Mo.
● Wiegand Co., Edwin L., Pittsburgh, Pa.
Wilcolator Co., Elizabeth, N. J.

THERMOSTATS, RADIANT HEAT

● Detroit Lubricator Co., Detroit, Mich.
● General Controls Co., Glendale, Calif.
● Mercoid Corp., The, Chicago, Ill.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
● Thrush & Co., H. A., Peru, Ind.
● White-Rodgers Electric Co., St. Louis, Mo.

THERMOSTATS, ROOM OR WALL

Armstrong Control Co., Inc., Portland, Ore.
● Armstrong Machine Wks., Three Rivers, Mich.
● Autempco Corp., New York, N. Y.
Automatic Products Co., Milwaukee, Wis.
Barber-Colman Co., Rockford, Ill.
Cam-Stat, Inc., Div. of The Paul Henry Co., Los Angeles, Calif.
Crise Mfg. Co., The, Columbus, O.
Crown Controls Co., Inc., New Bremen, O.
Delco Appliance Div., General Motors Corp., Rochester, N. Y.
● Detroit Lubricator Co., Detroit, Mich.
● General Controls Co., Glendale, Calif.
Gleason-Avery, Inc., Auburn, N. Y.
● Hoffman Specialty Co., Indianapolis, Ind.
Industrial Engineering Corp., Terre Haute, Ind.
● Johnson Service Co., Milwaukee, Wis.
McCorkle Co., D. H., Berkeley, Calif.
McLarty Systems, Battle Creek, Mich.
● Mercoid Corp., The, Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
● Powers Regulator Co., Chicago, Ill.
Sampsel Time Control, Inc., Spring Valley, Ill.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass.
Tallmadge & Co., Webster, East Orange, N. J.
● Thrush & Co., H. A., Peru, Ind.
Triplex Heating Specialty Co., Inc., Peru, Ind.
United Electric Controls Co., Watertown, Mass.
Vapor Heating Corp., Chicago, Ill.
White Mfg. Co., St. Paul, Minn.
● White-Rodgers Electric Co., St. Louis, Mo.
● Wiegand Co., Edwin L., Pittsburgh, Pa.

THERMOSTATS, SURFACE

Armstrong Control Co., Inc., Portland, Ore.
● Autempco Corp., New York, N. Y.
Barber-Colman Co., Rockford, Ill.
Cam-Stat, Inc., Div. of The Paul Henry Co., Los Angeles, Calif.
Cooper Co., Clark, Palmyra, N. J.
Detroit Lubricator Co., Detroit, Mich.
Fenwal, Inc., Ashland, Mass.
● General Controls Co., Glendale, Calif.
Hart Mfg. Co., Hartford, Conn.
● Hoffman Specialty Co., Indianapolis, Ind.
Industrial Engineering Corp., Terre Haute, Ind.
McCorkle Co., D. H., Berkeley, Calif.
Mechanical Industries Production Co., Akron, O.
● Mercoid Corp., The, Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
● Powers Regulator Co., Chicago, Ill.
Red Spot Electric Co., Tacoma, Wash.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass.
Stevens Mfg. Co., Inc., Mansfield, O.
Triplex Heating Specialty Co., Inc., Peru, Ind.
United Electric Controls Co., Watertown, Mass.
● Westinghouse Electric Corp., Pittsburgh, Pa.
White Mfg. Co., St. Paul, Minn.
● White-Rodgers Electric Co., St. Louis, Mo.
● Wiegand Co., Edwin L., Pittsburgh, Pa.

THERMOSTATS, TWO TEMPERATURE OR DUAL

Armstrong Control Co., Inc., Portland, Ore.
● Autempco Corp., New York, N. Y.
● Barber-Colman Co., Rockford, Ill.
Burling Instrument Co., Newark, N. J.
● Detroit Lubricator Co., Detroit, Mich.

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● General Controls Co., Glendale, Calif.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
Gleason-Avery, Inc., Auburn, N. Y.
H-B Instrument Co., Philadelphia, Pa.
● Illinois Engineering Co., Chicago, Ill.
Industrial Engineering Corp., Terre Haute, Ind.
● Johnson Service Co., Milwaukee, Wis.
● Mercoid Corp., The, Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Perfex Corp., Milwaukee, Wis.
● Powers Regulator Co., Chicago, Ill.
Ranco, Inc., Columbus, O.
● Sarcotherm Controls, Inc., New York, N. Y.
Sampsel Time Control, Inc., Spring Valley, Ill.
Tallmadge & Co., Webster, East Orange, N. J.
United Electric Controls Co., Watertown, Mass.
Vapor Heating Corp., Chicago, Ill.
● White-Rodgers Electric Co., St. Louis, Mo.

THERMOSTATS, WEATHER COMPENSATING

● Autempco Corp., New York, N. Y.
Automatic Devices Co., Inc., Chicago, Ill.
Barber-Colman Co., Rockford, Ill.
Crown Controls Co., Inc., New Bremen, O.
● Detroit Lubricator Co., Detroit, Mich.
Heat Timer Corp., New York, N. Y.
● Illinois Engineering Co., Chicago, Ill.
● Johnson Service Co., Milwaukee, Wis.
● Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
Miller-Harris Instrument Co., Milwaukee, Wis.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
● Powers Regulator Co., Chicago, Ill.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
Tallmadge & Co., Webster, East Orange, N. J.
United Electric Controls Co., Watertown, Mass.
● Webster & Co., Warren, Camden, N. J.
● White-Rodgers Electric Co., St. Louis, Mo.

TIME SWITCHES

See Switches, Time

TOGGLE BOLTS

See Bolts, Toggle and Anchor

TONGS, PIPE

Armstrong Bros. Tool Co., Chicago, Ill.
Billings & Spencer Co., Hartford, Conn.
Trimont Mfg. Co., Div. of Aetna Industrial Corp., Boston, Mass.
Williams & Co., J. H., Buffalo, N. Y.

TOOLS (CHISELS, PLIERS, SCREW DRIVERS, ETC.)

Bernz Co., Otto, Rochester, N. Y.
Billings & Spencer Co., Hartford, Conn.
● Bonney Forge & Tool Works, Allentown, Pa.
Crescent Tool Co., Jamestown, N. Y.
Duro Metal Products Co., Chicago, Ill.
Everhot Products Co., Chicago, Ill.
Greene, Tweed & Co., North Wales, Pa.
● Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill.
● Ingersoll-Rand Co., New York, N. Y.
International Nutyp Tool Co., Oswego, N. Y.
Interstate Sales Co., New York, N. Y. (Protractor for layout work and center-finder protractor)
Jackson Co., Thomas M., Detroit, Mich. (air duct, heat loss, and special calculators)
Lufkin Rule Co., Saginaw, Mich. (tape and folding rules)
Mall Tool Co., Chicago, Ill.
Mid-States Equipment Co., Chicago, Ill. (Saw gun)
● Mid-States Welder Mfg. Co., Chicago, Ill. (heavy duty power saw and file)
Millers Falls Co., Greenfield, Mass.
Misener Mfg. Co., Inc., Syracuse, N. Y. (Rotary hole saws)
Morey, Dan, Los Angeles, Calif. (soft face hammers and mallets)
Peck, Stow & Wilcox Co., Southington, Conn.
R C S Tool Sales Corp., Joliet, Ill. (reciprocating saw attachment)
Rawlplug Co., Inc., The, New York, N. Y. (drills for masonry)
Richmont, Inc., Los Angeles, Calif.
Rotary Concrete Drill Co., Pasadena, Calif. (Drill bits)
Schild Mfg. Co., Milwaukee, Wis.
Snap-on Tools Corp., Kenosha, Wis.
Thompson & Son Co., The Henry G., New Haven, Conn.
Three Point Industries, Chicago, Ill. (gage for determining pipe sizes)
Walton Co., Hartford, Conn. (Tap extractors)
Williams & Co., J. H., Buffalo, N. Y.

TOOLS, FLARING, FOR TUBING

Armstrong Mfg. Co., Bridgeport, Conn.
● Bonney Forge & Tool Works, Allentown, Pa.
Duro Metal Products Co., Chicago, Ill.
Everhot Products Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Leonard Precision Products Co., Garden Grove, Calif.
Parker Appliance Co., The, Cleveland, O.
Penn Brass & Copper Co., Erie, Pa.
Sac Tool Mfg. Co., St. Louis, Mo.
Weatherhead Co., Cleveland, O.
Williams & Co., J. H., Buffalo, N. Y.
Wilson, Inc., Thomas C., Long Island City, N. Y.

TORCHES, BRAZING AND SOLDERING

Aeroil Products Co., Inc., South Hackensack, N. J.
Air Reduction Sales Co., New York, N. Y.
Atkins & Co., E. C., Indianapolis, Ind.
Bernz Co., Otto, Rochester, N. Y.
Black Mfg. Co., The, Baltimore, Md.
Borm Mfg. Co., Elgin, Ill.
Century Aircraft Co., Los Angeles, Calif.
Clayton & Lambert Mfg. Co., Louisville, Ky.
Dockson Corp., Detroit, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Ergolyte Mfg. Co., Philadelphia, Pa.
General Scientific Equipment Co., Philadelphia, Pa.
Goss Gas, Inc., Pittsburgh, Pa.
Harris Calorific Co., The, Cleveland, O.
Ideal Industries, Inc., Sycamore, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Insto-Gas Corp., Detroit, Mich.
Johnson Gas Appliance Co., Cedar Rapids, Ia.
Lee Co., K. O., Aberdeen, S. D.
Lenk Mfg. Co., Boston, Mass.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Liquid Carbonic Corp., The, Chicago, Ill.
Marquette Mfg. Co., Minneapolis, Minn.
Mid-States Equipment Co., Chicago, Ill.
Minn-Kota Foundry & Mfg. Co., Fargo, N. D.
Modern Engineering Co., St. Louis, Mo.
National Cylinder Gas Co., Chicago, Ill.
Powder Weld Process Co., The, Brooklyn, N. Y.
Reiner & Campbell Co., Inc., Elizabeth, N. J.
Sac Tool Mfg. Co., St. Louis, Mo.
Sight Feed Generator Co., West Alexandria, O.
Smith Welding Equipment Corp., Minneapolis, Minn.
Torit Mfg. Co., St. Paul, Minn.
Trindl Products, Ltd., Chicago, Ill.
Turner Brass Works, The, Sycamore, Ill.
Victor Equipment Co., San Francisco, Calif.
Wall Chemicals Div. of The Liquid Carbonic Corp., Chicago, Ill.
Welding Apparatus Co., Chicago, Ill.
Will-Weld Mfg. Co., Inc., Omaha, Neb.

TORQUE INDICATING WRENCHES

See Wrenches, Torque Indicating

TOWERS, COOLING, ATMOSPHERIC

American Cooling Tower Co., Kansas City, Mo.
Binks Mfg. Co., Chicago, Ill.
● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Fluor Corp., Ltd., The, Los Angeles, Calif.
Harry Cooling Towers, Inc., New York, N. J.
● Lilie-Hoffmann Cooling Towers, Inc., St. Louis, Mo.
● Marley Co., Inc., Kansas City, Kan.
● New England Cooling Tower Co., Boston, Mass.
Pennsylvania Engineering Wks., New Castle, Pa.
Phillips Cooling Tower Co., Inc., New York, N. Y.
● Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Refrigeration Appliances, Inc., Chicago, Ill.
Santa Fe Tank & Tower Co., Los Angeles, Calif.
● Spraying Systems Co., Bellwood, Ill.
Stewart Ice Machine Co., Pomona, Calif.
Thermal Industries, Indio, Calif.
● United Cooling Tower Co., Kansas City, Mo.
Water Cooling Corp., New York, N. Y.
Water Cooling Equipment Corp., St. Louis, Mo.
Water Cooling Tower Co., Chicago, Ill.
● Wheeler Mfg. Co., C. H., Philadelphia, Pa.

TOWERS, COOLING, MECHANICAL DRAFT

Airtemp, Div. of Chrysler Corp., Dayton, O.
American Cooling Tower Co., Kansas City, Mo.
● Baltimore Aircoil Co., Inc., Baltimore, Md.
Binks Mfg. Co., Chicago, Ill.
● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Fluor Corp., Ltd., The, Los Angeles, Calif.
● Foster Wheeler Corp., New York, N. Y.
Goodfellow Co., E. D., Memphis, Tenn.
Harry Cooling Towers, Inc., New York, N. Y.
● Kennard Corp., St. Louis, Mo.
Larkin Coils, Atlanta, Ga.
● Lilie-Hoffmann Cooling Towers, Inc., St. Louis, Mo.
● Marley Co., Inc., Kansas City, Kan.
● Marlo Coil Co., St. Louis, Mo.
● Murray Mfg. Co., D. J., Wausau, Wis.
● New England Cooling Tower Co., Boston, Mass.
Pennsylvania Engineering Wks., New Castle, Pa.
Phillips Cooling Tower Co., Inc., New York, N. Y.
● Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Engineering, Inc., Los Angeles, Calif.
Santa Fe Tank & Tower Co., Los Angeles, Calif.
Thermal Industries, Indio, Calif.

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● Trane Co., The, LaCrosse, Wis.
● United Conditioning Corp., New York, N. Y.
● United Cooling Tower Co., Kansas City, Mo.
Water Cooling Corp., New York, N. Y.
Water Cooling Equipment Corp., St. Louis, Mo.
Water Cooling Tower Co., Chicago, Ill.
● Wheeler Mfg. Co., C. H., Philadelphia, Pa.

TRANSFORMERS, ELECTRIC

Arjac Products Inc., Rochester, N. Y.
Armstrong Control Co., Inc., Portland, Ore.
Bogue Electric Co., Paterson, N. J.
Canatsey Electric Mfg. Co., Kansas City, Mo.
Crown Controls Co., Inc., New Bremen, O.
Davis & Co., Dean W., Kentland, Ind.
Eisler Engineering Co., Inc., Newark, N. J.
Fluid Systems, Inc., New Haven, Conn.
● General Controls Co., Glendale, Calif.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Hampton Electric Mfg. Co., Pittsburgh, Pa.
Jefferson Electric Co., Bellwood, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Newark Transformer Co., Linden, N. J.
Rex Welder & Engineering Co., Kansas City, Mo.
Sola Electric Co., Chicago, Ill.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Super Electric Products Corp., Jersey City, N. J.
Taylor-Winfield Corp., Warren, O.
Trindl Products, Ltd., Chicago, Ill.
● Wagner Electric Corp., St. Louis, Mo.
Webster Electric Co., Racine, Wis.
West Coast Electrical Mfg. Co., Los Angeles, Calif.
● Westinghouse Electric Corp., Pittsburgh, Pa.

TRANSMISSION DRIVES

See Drives, Chain, Flat Belt and V-Belt

TRAPS, STEAM, MECHANICAL

Acker Organization, Inc., W. M., Cleveland, O.
● American District Steam Co., North Tonawanda, N. Y.
● Anderson Co., V. D., The, Cleveland, O.
● Armstrong Machine Wks., Three Rivers, Mich.
Bailey Co., Chas. M., San Francisco, Calif.
● Barnes & Jones, Inc., Boston, Mass.
● Bishop & Babcock Mfg. Co., Cleveland, O.
Boylston Steam Specialty Co., Chicago, Ill.
Burrows Mfg. Co., F. A., York, Pa.
Cashin Co., W. D., Boston, Mass.
Clark Mfg. Co., Cleveland, O.
Coe Mfg. Co., Painesville, O.
● Crane Co., Chicago, Ill.
Cryer Trap & Valve Co., Inc., New York, N. Y.
Davis Engineering Corp., Elizabeth, N. J.
● Davis Regulator Co., Chicago, Ill.
● Dunham Co., C. A., Chicago, Ill.
Ellis Drier Co., Chicago, Ill.
● Fisher Governor Co., Marshalltown, Ia.
Healy Ruff Co., St. Paul, Minn.
● Hoffman Specialty Co., Indianapolis, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
● Illinois Engineering Co., Chicago, Ill.
Johnson Corp., The, Three Rivers, Mich.
Justus Steam Trap Co., Napanoch, N. Y.
Kaye & MacDonald, Inc., West Orange, N. J.
Keckley Co., O. C., Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
Leavitt Machine Co., Orange, Mass.
● Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
McAlear Mfg. Co., Chicago, Ill.
McAuley Trap Co., Pittsburgh, Pa.
Milwaukee Valve Co., Milwaukee, Wis.
Monash-Younker Co., Inc., Chicago, Ill.
Morehead Mfg. Co., Detroit, Mich.
Mouat Vapor Heating Co., The, Cleveland, O.
Nason Co., Detroit, Mich.
● Nicholson & Co., W. H., Wilkes-Barre, Pa.
Rockwell Co., W. S., Fairfield, Conn.
● Sarco Co., Inc., New York, N. Y.
Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
Squires Co., C. E., Cleveland, O.
Sterling Engineering & Mfg. Corp., Hyde Park, Mass.
● Sterling, Inc., Milwaukee, Wis.
Stickle Steam Specialties Co., Indianapolis, Ind.
● Strong, Carlisle & Hammond Co., Cleveland, O.
● Swartwout Co., Cleveland, O.
Templeton Bros., Hyde Park, Mass.
● Trane Co., The, LaCrosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Vapor Heating Corp., Chicago, Ill.
Watson & McDaniel Co., Philadelphia, Pa.
● Webster & Co., Warren, Camden, N. J.
Williams Gauge Co., The, Pittsburgh, Pa.
Wright-Austin Co., Detroit, Mich. (Combination)
● Yarnall-Waring Co., Philadelphia, Pa.

TRAPS, STEAM, THERMOSTATIC

● American District Steam Co., North Tonawanda, N. Y.
● Barnes & Jones, Inc., Boston, Mass.
● Bishop & Babcock Mfg. Co., Cleveland, O.
Cashin Co., W. D., Boston, Mass.
Cryer Trap & Valve Co., Inc., New York, N. Y.
● Dunham Co., C. A., Chicago, Ill.
● Haines & Co., William S., Philadelphia, Pa.
● Hoffman Specialty Co., Indianapolis, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
● Illinois Engineering Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
McAlear Mfg. Co., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Monash-Younker Co., Inc., Chicago, Ill.
Mouat Vapor Heating Co., The, Cleveland, O.
● Nicholson & Co., W. H., Wilkes-Barre, Pa.
● Powers Regulator Co., Chicago, Ill.
● Sarco Co., Inc., New York, N. Y.
Simplex Heating Specialty Co., Inc., Lynchburg, Va.
● Sterling, Inc., Milwaukee, Wis.
Stickle Steam Specialties Co., Indianapolis, Ind.
● Swartwout Co., Cleveland, O.
● Trane Co., The, LaCrosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Vapor Heating Corp., Chicago, Ill.
Vapor Specialty Co., New York, N. Y.
● Webster & Co., Warren, Camden, N. J.

TREATMENT, FUEL OIL, TO PREVENT SLUDGE

Allen Co., Robert G., Mechanicsville, N. Y.
Alrose Chemical Co., Providence, R. I.
Ampion Corp., Long Island City, N. Y.
Anderson-Stolz Corp., Kansas City, Mo.
Bird-Archer Co., Philadelphia, Pa.
Celco Corp., New York, N. Y.
Elraco Engineering Co., Los Angeles, Calif.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
National Airoil Burner Co., Inc., Philadelphia, Pa.
National Aluminate Corp., Chicago, Ill.
Perolin Co., Inc., Chicago, Ill.
S. O. S. Products Co., Inc., Brooklyn, N. Y.

TREATMENT, STEAM SYSTEM, TO INHIBIT CORROSION

American Water Softener Co., Philadelphia, Pa.
Ampion Corp., Long Island City, N. Y.
Anderson-Stolz Corp., Kansas City, Mo.
Apex All Weather Products, Chicago, Ill.
Apex Engineering Co., Chicago, Ill.
Aquatic Chemical Laboratories, Inc., New York, N. Y.
Bird-Archer Co., Philadelphia, Pa.
● Brown Electro Co., Oklahoma City, Okla.
Calgon, Inc., Pittsburgh, Pa.
Cannon Chemical Co., Inc., Cambridge, Mass.
Carbide and Carbon Chemicals Corp., Unit of Carbide & Carbon Corp., New York, N. Y.
Chemical Engineering Co., Dallas, Tex.
Cochrane Corp., Philadelphia, Pa.
Continental Products Co., Euclid, O.
Elgin Softener Corp., Elgin, Ill.
Graver Water Conditioning Co., New York, N. Y.
Haering & Co., Inc., D. W., Chicago, Ill.
Kenite Laboratory, Inc., Madison, N. J.
Liquid Conditioning Corp., Philadelphia, Pa.
McRay Sales Co., South Pasadena, Calif.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
National Aluminate Corp., Chicago, Ill.
% Proportioneers, Inc. %, Providence, R. I.
Rid-Sludge Div., Aulwood Mfg. Co., St. Paul, Minn. (vapor treatment to remove sludge from heating system)
Roy Co., Milton, Philadelphia, Pa.
Saverite Engineering Co., Hoboken, N. J.
Sulflo, Inc., Elizabeth, N. J.
Turco Products, Inc., Los Angeles, Calif.
Vinco Co., Inc., The, New York, N. Y.
Water Treatment Co. of America, Pittsburgh, Pa.
Western Chemical Co., Kansas City, Mo.
X Laboratories, Inc., New York, N. Y.

TREATMENT, WATER, TO INHIBIT CORROSION

● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Cyanamid & Chemical Corp., New York, N. Y.
American K. A. T. Corp., New York, N. Y.
American Water Softener Co., Philadelphia, Pa.
American Well Works, Aurora, Ill.
Ampion Corp., Long Island City, N. Y.
Anderson-Stolz Corp., Kansas City, Mo.
Aquatic Chemical Laboratories, Inc., New York, N. Y.
Bird-Archer Co., Philadelphia, Pa.
Bogue Electric Co., Paterson, N. J.
Calgon, Inc., Pittsburgh, Pa.
Cannon Chemical Co., Inc., Cambridge, Mass.

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Carbide and Carbon Chemicals Corp., Unit of Carbide & Carbon Corp., New York, N. Y.
Chemical Engineering Co., Dallas, Tex.
Dearborn Chemical Co., Chicago, Ill.
Dowell Inc., Tulsa, Okla.
Elgin Softener Corp., Elgin, Ill.
Ferro-Nil Corp., New York, N. Y.
Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
General Filter Co., Ames, Ia.
Graver Water Conditioning Co., New York, N. Y.
Grief, Edward C., Bogota, N. J.
Haering & Co., Inc., D. W., Chicago, Ill.
Hagan Corp., Pittsburgh, Pa.
Heilman Boiler Wks., Inc., Allentown, Pa.
Kenite Laboratory, Inc., Madison, N. J.
Liquid Conditioning Corp., Philadelphia, Pa.
Maintenance Engineering Corp., Houston, Tex.
McRay Sales Co., South Pasadena, Calif.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
Monsanto Chemical Co., St. Louis, Mo.
National Aluminate Corp., Chicago, Ill.
North American Fibre Products Co., The, Cleveland, O.
O'Brien Industries, Jersey City, N. J.
% Proportioneers, Inc., %, Providence, R. I.
Permutit Co., New York, N. Y.
Perolin Co., Inc., Chicago, Ill.
Refinite Corp., Omaha, Nebr.
● Research Products Corp., Madison, Wis.
Rodwell Engineering & Sales Co., Omaha, Neb.
Roy Co., Milton, Philadelphia, Pa.
Saverite Engineering Co., Hoboken, N. J.
Sudbury Laboratory, South Sudbury, Mass.
Sulfio, Inc., Elizabeth, N. J.
Turco Products, Inc., Los Angeles, Calif.
Uniflow Mfg. Co., Erie, Pa.
Vinco Co., Inc., The, New York, N. Y.
Wallace & Tiernan Co., Inc., Newark, N. J.
Warlo Corp., New York, N. Y.
Water Refining Co., Ft. Wayne, Ind.
Water Service Laboratories, Inc., New York, N. Y.
Water Treatment Company of America, Pittsburgh, Pa.
Western Chemical Co., Kansas City, Mo.
Worthington Pump & Machinery Corp., Harrison, N. J.
X Laboratories, Inc., New York, N. Y.

TREATMENT, WATER, FOR SLIME AND ALGAE CONTROL

Alrose Chemical Co., Providence, R. I.
American Water Softener Co., Philadelphia, Pa.
American Well Works, Aurora, Ill.
Ampion Corp., Long Island City, N. Y.
Anderson-Stolz Corp., Kansas City, Mo.
Aquatic Chemical Laboratories, Inc., New York, N. Y.
Bird-Archer Co., Philadelphia, Pa.
Carolina Aniline & Extract Co., Charlotte, N. C.
Chemical Engineering Co., Dallas, Tex.
Dearborn Chemical Co., Chicago, Ill.
Dowell Inc., Tulsa, Okla.
General Filter Co., Ames, Ia.
General Ozone Corp., Chicago, Ill.
Graver Water Conditioning Co., New York, N. Y.
Haering & Co., Inc., D. W., Chicago, Ill.
Kenite Laboratory, Inc., Madison, N. J.
Liquid Conditioning Corp., Philadelphia, Pa.
McRay Sales Co., South Pasadena, Calif.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
National Aluminate Corp., Chicago, Ill.
Norwood Filtration Co., The, Holyoke, Mass.
Oakite Products, Inc., New York, N. Y.
O'Brien Industries, Jersey City, N. J.
% Proportioneers, Inc., %, Providence, R. I.
Permutit Co., New York, N. Y.
Refinite Corp., Omaha, Nebr.
Roy Co., Milton, Philadelphia, Pa.
Solvay Sales Div., Allied Chemical & Dye Corp., New York, N. Y.
Wallace & Tiernan Co., Inc., Newark, N. J.
Western Chemical Co., Kansas City, Mo.

TRY-COCKS, BOILER

Bailey Co., Chas. M., San Francisco, Calif.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
● Crane Co., Chicago, Ill.
Detroit Brass & Malleable Works, Detroit, Mich.
Diamond Power Specialty Corp., Detroit, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Keckley Co., O. C., Chicago, Ill.
● Lunkenheimer Co., Cincinnati, O.
Magnetrol, Inc., Chicago, Ill.
Reliance Gauge Column Co., Cleveland, O.
Robert Mfg. Co., Los Angeles, Calif.
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.

TUBE CLEANERS

See Cleaners, Tube

TUBES, BOILER

Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Globe Steel Tubes Co., Milwaukee, Wis.
● H & H Tube & Mfg. Co., Detroit, Mich.
National Tube Co., United States Steel Corp., Sub., Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
Scovill Mfg. Co., Waterbury, Conn.
Standard Tube Co., Detroit, Mich.
Trent Tube Mfg. Co., East Troy, Wis. (stainless)

TUBES, CONDENSER

American Brass Co., Waterbury, Conn.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Bridgeport Brass Co., Bridgeport, Conn.
● Bundy Tubing Co., Detroit, Mich.
● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Globe Steel Tubes Co., Milwaukee, Wis.
National Tube Co., United States Steel Corp., Subsidiary, Pittsburgh, Pa.
Pacific Tube Co., Los Angeles, Calif.
Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
● Revere Copper and Brass Incorporated, New York, N. Y.
Reynolds Metals Co., Louisville, Ky.
Scovill Mfg. Co., Waterbury, Conn.
Standard Tube Co., Detroit, Mich.
Timken Roller Bearing Co., Canton, O.
Trent Tube Mfg. Co., East Troy, Wis. (stainless)
Warren Foundry & Pipe Corp., New York, N. Y.
Wolverine Tube Div. of Calumet & Hecla Consolidated Copper Co., Detroit, Mich.
● York Corp., York, Pa.

TUBES, PITOT

Defender Instrument and Regulator Co., St. Louis, Mo.
Dwyer Mfg. Co., F. W., Chicago, Ill.
Ellison Draft Gage Co., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
Hill, E. Vernon & Co., Chicago, Ill.
● Illinois Testing Laboratories, Inc., Chicago, Ill.
Meriam Instrument Co., The, Cleveland, O.
● Taylor Instrument Companies, Rochester, N. Y.

TUBING, ALUMINUM

Aluminum Co. of America, Pittsburgh, Pa.
B & M Mfg. Co., East Orange, N. J.
Colonial Alloys Co., Metals Div., Philadelphia, Pa.
Lewin-Mathes Co., Lewin Metals Div., St. Louis, Mo.
● Revere Copper and Brass Incorporated, New York, N. Y.
Reynolds Metals Co., Louisville, Ky.
Wolverine Tube Div., Calumet & Hecla Consolidated Copper Co., Detroit, Mich.

TUBING BENDERS

See Benders, Tubing

TUBING, BRASS AND COPPER

American Brass Co., Waterbury, Conn.
B & M Mfg. Co., East Orange, N. J.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Everhot Products Co., Chicago, Ill.
● H & H Tube & Mfg. Co., Detroit, Mich.
Hussey & Co., C. G., Pittsburgh, Pa.
Keeney Mfg. Co., Newington, Conn. (Chrome plated)
Kensico Tube Co., Mt. Kisco, N. Y.
Lewin-Mathes Co., Lewin Metals Div., St. Louis, Mo.
Mueller Brass Co., Port Huron, Mich.
Parker Appliance Co., The, Cleveland, O.
Penn Brass & Copper Co., Erie, Pa.
Phelps Dodge Copper Products Corp., British American Tube Div., New York, N. Y.
Reading Tube Corp., Long Island City, N. Y.
● Revere Copper and Brass Incorporated, New York, N. Y.
Roberts Tube Works, Detroit, Mich.
Viking Copper Tube Co., Cleveland, O.
Wolverine Tube Div. of Calumet and Hecla Consolidated Copper Co., Detroit, Mich.

TUBING, BRONZE

American Brass Co., Waterbury, Conn.
B & M Mfg. Co., East Orange, N. J.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
● Revere Copper and Brass, Incorporated, New York, N. Y.

TUBING CUTTERS

See Cutters, Tubing

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TUBING, DUPLEX

American Brass Co., Waterbury, Conn.
Bridgeport Brass Co., Bridgeport, Conn.
Pacific Tube Co., Los Angeles, Calif. (Non-ferrous to ferrous)
Republic Steel Corp., Steel & Tubes Div., Cleveland, O. (Steel and copper)
Trent Tube Mfg. Co., East Troy, Wis. (Stainless & carbon)

TUBING, FINNED

● Aerofin Corp., Syracuse, N. Y.
American Coils Co., Newark, N. J.
Brown Fintube Co., The, Elyria, O.
● Bush Mfg. Co., West Hartford, Conn.
Chicago Fan & Fin Coil Co., Chicago, Ill.
● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
● Doyle & Roth Mfg. Co., Brooklyn, N. Y.
Fintube Coil Corp., Alhambra, Calif.
● G. & O. Mfg. Co., New Haven, Conn.
Griscom-Russell Co., The, New York, N. Y.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Kramer Trenton Co., Trenton, N. J.
● McCord Corp., Detroit, Mich.
Merchant & Evans Co., Philadelphia, Pa.
Minimite Co., Chicago, Ill.
Peerless of America, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
● Rempe Co., Chicago, Ill.
Rome-Turney Radiator Co., Rome, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
Tenney Engineering, Inc., Newark, N. J.
● Tilco-Fin-Tubing Div., David E. Kennedy, Inc., Brooklyn, N. Y.
Vapor Heating Corp., Chicago, Ill.
Wolverine Tube Div. of Calumet and Hecla Consolidated Copper Co., Detroit, Mich. (Aluminum, copper)
● Young Radiator Co., Racine, Wis.

TUBING, MAGNESIUM

B & M Mfg. Co., East Orange, N. J.
Dow Chemical Co., The, Midland, Mich.

TUBING, NICKEL AND NICKEL ALLOY

Agaloy Tubing Co., Springfield, O.
B & M Mfg. Co., East Orange, N. J.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bridgeport Brass Co., Bridgeport, Conn.
● Bundy Tubing Co., Detroit, Mich.
General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Globe Steel Tubes Co., Milwaukee, Wis.
International Nickel Co., Inc., The, New York, N. Y.
National Tube Co., United States Steel Corp., Subsidiary, Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
● Revere Copper and Brass Incorporated, New York, N. Y.
Trent Tube Mfg. Co., East Troy, Wis.

TUBING, PLASTIC

Acadia Synthetic Products Div., Western Felt Works, Chicago, Ill.
American Hard Rubber Co., New York, N. Y.
Commercial Plastics Co., Chicago, Ill.
Continental-Diamond Fibre Co., Newark, Del.
Extruded Plastics, Inc., Norwalk, Conn.
Gates Rubber Co., The, Denver, Cloo.
General Electric Co., Chemical Dept., Pittsfield, Mass.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Haveg Corp., Newark, Del.
Irvington Varnish and Insulator Co., Irvington, N. J.
Mills Corp., Elmer E., Chicago, Ill.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Panelyte Div., St. Regis Paper Co., New York, N. Y.
Parker Appliance Co., The, Cleveland, O.
Presstite Engineering Co., St. Louis, Mo.
Resistoflex Corp., Belleville, N. J.
Sandee Mfg. Co., Chicago, Ill.
United States Rubber Co., New York, N. Y.
United States Stoneware Co., New York, N. Y.
Yardley Plastics Co., Columbus, O.

TUBING, SILVER CLAD AND SILVER ALLOY

General Plate Div., Metals & Controls Corp., Attleboro, Mass.
● Revere Copper & Brass, Inc., New York, N. Y.

TUBING, STEEL, ALLOY, SEAMLESS

Agaloy Tubing Co., Springfield, O.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Globe Steel Tubes Co., Milwaukee, Wis.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
National Tube Co., United States Steel Corp., Subsidiary, Pittsburgh, Pa.
Pacific Tube Co., Los Angeles, Calif.
Pittsburgh Steel Co., Pittsburgh, Pa.
● Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Timken Roller Bearing Co., Canton, O.
● Youngstown Sheet & Tube Co., Youngstown, O.

TUBING, STEEL, ALLOY, WELDED

Agaloy Tubing Co., Springfield, O.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Duraloy Co., Scottdale, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Laclede Steel Co., St. Louis, Mo.
Pacific Tube Co., Los Angeles, Calif.
Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
● Revere Copper and Brass Incorporated, New York, N. Y.
● Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Standard Tube Co., Detroit, Mich.
Trent Tube Mfg. Co., East Troy, Wis.
● Youngstown Sheet & Tube Co., Youngstown, O.

TUBING, STEEL, SEAMLESS

Agaloy Tubing Co., Springfield, O.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Everhot Products Co., Chicago, Ill.
Globe Steel Tubes Co., Milwaukee, Wis.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
National Tube Co., United States Steel Corp., Subsidiary, Pittsburgh, Pa.
Pacific Tube Co., Los Angeles, Calif.
Parker Appliance Co., The, Cleveland, O.
Pittsburgh Steel Co., Pittsburgh, Pa.
● Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Timken Roller Bearing Co., Canton, O.
● Youngstown Sheet & Tube Co., Youngstown, O.

TUBING, STEEL, STAINLESS

Agaloy Tubing Co., Springfield, O.
Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
B & M Mfg. Co., East Orange, N. J.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Globe Steel Tubes Co., Milwaukee, Wis.
National Tube Co., United States Steel Corp. Sub., Pittsburgh, Pa.
Pacific Tube Co., Los Angeles, Calif.
Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
Standard Tube Co., Detroit, Mich.
Timken Roller Bearing Co., Canton, O.
Trent Tube Mfg. Co., East Troy, Wis.

TUBING, STEEL, WELDED

Agaloy Tubing Co., Springfield, O.
Armco Steel Corp., Middletown, O.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Babcock & Wilcox Tube Co., The, Welded Tube Div., Alliance, O.
Bethlehem Steel Co., Bethlehem, Pa.
● Bundy Tubing Co., Detroit, Mich.
Everhot Products Co., Chicago, Ill.
Globe Steel Tubes Co., Milwaukee, Wis.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Laclede Steel Co., St. Louis, Mo.
National Tube Co., United States Steel Corp., Subsidiary, Pittsburgh, Pa.
Nikoh Tube Co., Chicago, Ill.
Pacific Tube Co., Los Angeles, Calif.
Pittsburgh Steel Co., Pittsburgh, Pa.
Pittsburgh Tube Co., Pittsburgh, Pa.
Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
● Revere Copper and Brass Incorporated, New York, N. Y.
South Chester Tube Co., Chester, Pa.
● Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Standard Tube Co., Detroit, Mich.
● Wheatland Tube Co., Philadelphia, Pa.
● Youngstown Sheet & Tube Co., Youngstown, O.

TURBINES, MECHANICAL DRIVE

Carling Turbine Blower Co., Worcester, Mass.
Coppus Engineering Corp., Worcester, Mass.
Dean Hill Pump Co., Indianapolis, Ind.
De Laval Steam Turbine Co., Trenton, N. J.
Elliott Co., Jeannette, Pa.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Murray Iron Wks. Co., Burlington, Ia.
● Pyle-National Co., The, Chicago, Ill.
Steam Turbine Div., Worthington Pump and Machinery Corp., Wellesville, N. Y.
Terry Steam Turbine Co., Hartford, Conn.
● Westinghouse Electric Corp., Pittsburgh, Pa.
● Wing Mfg. Co., L. J., New York, N. Y.

2, 3 AND 4-WAY VALVES

See Valves, 2, 3 and 4-way

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ULTRASONIC DUST AND FUME COLLECTION

See Collection, Dust and Fume, Ultrasonic

UNDERGROUND PIPING

See Conduit, Underground Piping

UNDERWATER HEATERS

See Heaters, Steam Jet, for Liquids

UNIONS, BRASS

Acheson Mfg. Co., Rankin, Pa.
Commonwealth Brass Corp., Detroit, Mich.
● Crane Co., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
General Fittings Co., Providence, R. I.
Gilbert Brass Foundry Co., St. Louis, Mo.
Grabler Mfg. Co., Cleveland, O.
Imperial Brass Mfg. Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
King Union Co., Inc., Hillsgrove, R. I.
● Lunkenheimer Co., Cincinnati, O.
Mueller Brass Co., Port Huron, Mich.
Parker Appliance Co., The, Cleveland, O.
Phoenix Brass Fittings Corp., Irvington, N. J.
Powell Co., Wm., Cincinnati, O.
Rhode Island Fittings Co., Providence, R. I.
Union Metal Works, Chelsea, Mass.
● Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburg, Pa.

UNIONS, MALLEABLE, BRASS SEAT

Beaton & Corbin Mfg. Co., Southington, Conn.
Corley Co., Inc., The, Jersey City, N. J.
● Crane Co., Chicago, Ill.
Dart Mfg. Co., E. M., Providence, R. I.
Detroit Brass & Malleable Wks., Detroit, Mich.
● Fairbanks Co., New York, N. Y.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Flori Pipe Co., The, St. Louis, Mo.
General Fittings Co., Providence, R. I.
Grabler Mfg. Co., Cleveland, O.
● Grinnell Co., Inc., Providence, R. I.
Illinois Malleable Iron Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
● Jefferson Union Co., Inc., New York, N. Y.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
King Union Co., Inc., Hillsgrove, R. I.
Malleable Iron Fittings Co., Branford, Conn.
Rhode Island Fittings Co., Providence, R. I.
Rockwood Sprinkler Co., Worcester, Mass.
Star Mfg. Co., Inc., Providence, R. I.
Stockham Valves & Fittings, Birmingham, Ala.
● Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburg, Pa.

UNIONS, ORIFICE

Catawissa Valve & Fittings Co., Catawissa, Pa.
Conoflow Corp., Philadelphia, Pa.
Flori Pipe Co., The, St. Louis, Mo.
● Watson-Stillman Co., Roselle, N. J.

UNIONS, STEEL

Alloy Steel Products Co., Linden, N. J. (Stainless steel)
Capitol Mfg. & Supply Co., Columbus, O.
Catawissa Valve & Fittings Co., Catawissa, Pa.
Champion Machine & Forging Co., Cleveland, O.
● Crane Co., Chicago, Ill.
Dart Mfg. Co., E. M., Providence, R. I.
DAS Div. of Defiance Automatic Screw Co., Defiance, O.
● Fairbanks Co., New York, N. Y.
Flori Pipe Co., The, St. Louis, Mo.
● Frick Co., Waynesboro, Pa.
Gilbert Brass Foundry Co., St. Louis, Mo.
Hasco Valve & Machine Co., Milwaukee, Wis. (Stainless steel and alloy only)
● Henry Valve Co., Melrose Park, Ill.
Rockwood Sprinkler Co., Worcester, Mass.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
● Watson-Stillman Co., Roselle, N. J.

UNIT COOLERS

See Coolers, Unit

UNIT HEATERS

See Heaters, Unit

UNIT VENTILATORS

See Ventilators, Unit

UNITS, AIR CONDITIONING, CENTRAL STATION TYPE

Self contained blower, heating and/or cooling coil, filter, humidifier unit for remote location and duct air distribution

● Air & Refrigeration Corp., New York, N. Y.
Airtemp, Div. of Chrysler Corp., Dayton, O.
● Alton Mfg. Co., Dallas, Tex.
● American Blower Corp., Detroit, Mich.
American Cooling Tower Co., Kansas City, Mo.
American Thermal Industries, Inc., Detroit, Mich.
Anetsberger Bros., Inc., Northbrook, Ill.
Bahnson Co., Winston-Salem, N. C.
Baker Refrigeration Corp., South Windham, Me.
Bayley Blower Co., Milwaukee, Wis.
Blazer, M., & Son, Passaic, N. J.
Bryant Heater Div., Affiliated Gas Equipment Co. Inc., Cleveland, O.
● Buffalo Forge Co., Buffalo, N. Y.
● Carrier Corp., Syracuse, N. Y.
● Clarage Fan Co., Kalamazoo, Mich.
● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
● Doyle & Roth Mfg. Co., Brooklyn, N. Y.
Drayer & Hanson, Inc., Los Angeles, Calif.
Drying Systems, Inc., Chicago, Ill.
Frigidaire Div., General Motors Corp., Dayton, O.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Engineering & Mfg. Co., St. Louis, Mo.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
● Governair Corp., Oklahoma City, Okla.
Hastings Air Conditioning Co., Hastings, Neb.
● Howe Ice Machine Co., Chicago, Ill.
Jaden Mfg. Co., Hastings, Neb.
Kauffman Air Conditioning Corp., St. Louis, Mo.
● Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
● Marlo Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
Nevinger Mfg. Co., Inc., Greenville, Ill.
● Niagara Blower Co., New York, N. Y.
Palmer Mfg. Corp., Phoenix, Ariz.
Parks-Cramer Co., Fitchburg, Mass.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
Rigidbilt Inc., Chicago, Ill.
Rinehart Inc., Richmond, Ind.
St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Sterling Air Conditioning Corp., Washington, D. C.
● Surface Combustion Corp., Toledo, O.
Temp-Control Inc., Peoria, Ill.
● Trane Co., The, La Crosse, Wis.
● Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
● United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
● Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Worthington Pump & Machinery Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
● York Corp., York, Pa.
● Young Radiator Co., Racine, Wis.

UNITS, AIR CONDITIONING, HORIZONTAL PACKAGE TYPE

Self contained blower, cooling and/or heating coil, filter, humidifier unit for ceiling or platform location in space conditioned, for connection to remote compressor or cold water supply, and steam or hot water

● Air & Refrigeration Corp., New York, N. Y.
Airecon Industries, Detroit, Mich.
Airtemp, Div. of Chrysler Corp., Dayton, O.
American Thermal Industries, Inc., Detroit, Mich.
Baker Refrigeration Corp., South Windham, Me.
Blazer, M., & Son, Passaic, N. J.
● Buffalo Forge Co., Buffalo, N. Y.
● Bush Mfg. Co., West Hartford, Conn.
● Carrier Corp., Syracuse, N. Y.
● Clarage Fan Co., Kalamazoo, Mich.
Conditionaire Unit Co., Chicago, Ill.
● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Drayer & Hanson, Inc., Los Angeles, Calif.
Drying Systems, Inc., Chicago, Ill.
Frigidaire Div., General Motors Corp., Dayton, O.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
● Governair Corp., Oklahoma City, Okla.
Hastings Air Conditioning Co., Hastings, Neb.
Jaden Mfg. Co., Hastings, Neb.
Kauffman Air Conditioning Corp., St. Louis, Mo.
● Kennard Corp., St. Louis, Mo.
● King Co., The, Owatonna, Minn.
Kramer Trenton Co., Trenton, N. J.
● Marlo Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
Nevinger Mfg. Co., Inc., Greenville, Ill.
● Niagara Blower Co., New York, N. Y.

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- Refrigeration Appliances Inc., Chicago, Ill.
- Refrigeration Economics Co., Inc., Canton, O.
- Refrigeration Engineering, Inc., Los Angeles, Calif.
- ● Rempe Co., Chicago, Ill.
- Rigidbilt Inc., Chicago, Ill.
- Rinehart Inc., Richmond, Ind.
- St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
- Temp-Control Inc., Peoria, Ill.
- Tenney Engineering, Inc., Newark, N. J.
- ● Trane Co., The, La Crosse, Wis.
- ● Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
- ● United States Air Conditioning Corp., Minneapolis, Minn.
- Vilter Mfg. Co., Milwaukee, Wis.
- Western Blower Co., Seattle, Wash.
- ● Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
- Worthington Pump & Machinery Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
- X L Refrigerating Co., Chicago, Ill.
- ● York Corp., York, Pa.
- ● Young Radiator Co., Racine, Wis.

UNITS, AIR CONDITIONING, INDUSTRIAL TYPE

- ● Air & Refrigeration Corp., New York, N. Y.
- Airecon Industries, Detroit, Mich.
- ● American Blower Corp., Detroit, Mich.
- American Cooling Tower Co., Kansas City, Mo.
- American Thermal Industries, Inc., Detroit, Mich.
- Anetsberger Bros., Inc., Northbrook, Ill.
- Baker Refrigeration Corp., South Windham, Me.
- Blazer, M., & Son, Passaic, N. J.
- Bryant Heater Div., Affiliated Gas Equipment Co., Inc., Cleveland, O.
- ● Buffalo Forge Co., Buffalo, N. Y.
- ● Bush Mfg. Co., West Hartford, Conn.
- ● Carrier Corp., Syracuse, N. Y.
- ● Clarage Fan Co., Kalamazoo, Mich.
- ● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
- Drayer & Hanson, Inc., Los Angeles, Calif.
- Drying Systems, Inc., Chicago, Ill.
- Economy Equipment Co., Chicago, Ill.
- ● Frick Co., Waynesboro, Pa.
- Frigidaire Div., General Motors Corp., Dayton, O.
- General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
- General Engineering & Mfg. Co., St. Louis, Mo.
- General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
- ● Governair Corp., Oklahoma City, Okla.
- ● Howe Ice Machine Co., Chicago, Ill.
- Industrial Mfg. & Engineering Co., Chicago, Ill.
- Jaden Mfg. Co., Hastings, Neb.
- Kauffman Air Conditioning Corp., St. Louis, Mo.
- ● Kennard Corp., St. Louis, Mo.
- Kramer Trenton Co., Trenton, N. J.
- Larkin Coils, Atlanta, Ga.
- Lintern Co., Berea, O.
- ● Marlo Coil Co., St. Louis Mo.
- McQuay, Inc., Minneapolis, Minn.
- Nevinger Mfg. Co., Inc., Greenville, Ill.
- ● New York Blower Co., Chicago, Ill. (Make-up air units)
- ● Niagara Blower Co., New York, N. Y.
- Parks-Cramer Co., Fitchburg, Mass.
- Pfening Co., Fred D., Columbus, O.
- Refrigeration Appliances, Inc., Chicago, Ill.
- Refrigeration Economics Co., Inc., Canton, O.
- Refrigeration Engineering, Inc., Los Angeles, Calif.
- ● Rempe Co., Chicago, Ill.
- Rigidbilt Inc., Chicago, Ill.
- Rinehart Inc., Richmond, Ind.
- St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
- Somers, Inc., H. J., Detroit, Mich.
- ● Surface Combustion Corp., Toledo, O.
- Temp-Control, Inc., Peoria, Ill.
- ● Trane Co., The, La Crosse, Wis.
- ● Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
- ● United States Air Conditioning Corp., Minneapolis, Minn.
- Vilter Mfg. Co., Milwaukee, Wis.
- ● Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
- Worthington Pump & Machinery Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
- X L Refrigerating Co., Chicago, Ill.
- ● York Corp., York, Pa.
- ● Young Radiator Co., Racine, Wis.

UNITS, AIR CONDITIONING, REVERSE REFRIGERATION CYCLE

- Drayer & Hanson, Inc., Los Angeles, Calif.
- General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
- General Engineering & Mfg. Co., St. Louis, Mo.
- Muncie Gear Works, Inc., Muncie, Ind.
- Northwest Heating, Inc., Portland, Ore.
- Terra-Temp Co., Inc., Indianapolis, Ind.
- Webber Engineering Corp., Indianapolis, Ind.
- ● York Corp., York, Pa.

UNITS, AIR CONDITIONING, SUMMER, EVAPORATIVE COOLING TYPE

For cooling by evaporation, no dehumidification

- Air Equipment Co., Denver, Colo.
- ● Air & Refrigeration Corp., New York, N. Y.
- ● Alton Mfg. Co., Dallas, Tex.
- ● American Blower Corp., Detroit, Mich.
- American Cooling Tower Co., Kansas City, Mo.
- Aqua-Mist Co., Topeka, Kans.
- Auburn Foundry, Inc., Stoker Div., Auburn, Ind.
- Bahnson Co., Winston-Salem, N. C.
- Barwick Mfg. Corp., Wichita, Kan.
- Campbell Heating Co., E. K., Kansas City, Mo.
- ● Carrier Corp., Syracuse, N. Y.
- Central States Mfg. Co., Inc., Arkansas City, Kas.
- Climax Machinery Co., Indianapolis, Ind.
- ● Comfort Products Corp., Dallas, Tex.
- Dearborn Stove Co., Dallas, Tex.
- Essick Mfg. Co., Los Angeles, Calif.
- ● Farr Co., Los Angeles, Calif.
- Goettl Bros. Metal Prod., Inc., Phoenix, Ariz.
- Great National Air Conditioning Corp., Oklahoma City, Okla.
- International Metal Products Co., Phoenix, Ariz.
- International Sales Co., San Francisco, Calif.
- Lennox Furnace Co., Marshalltown, Ia., Syracuse, N. Y., & Columbus, O.
- Little Giant Vaporizer Co., Inc., Oklahoma City, Okla.
- Martin Fan & Blower Co., Chicago, Ill.
- Montag Stove & Furnace Works, Portland, Ore.
- Morey, Dan, Los Angeles, Calif.
- Mountain States Equipment Co., Denver, Colo.
- National Engineering & Mfg. Co., Kansas City, Mo.
- National Gas Equipment Co., Inc., Terrell, Tex.
- ● Niagara Blower Co., New York, N. Y.
- Ohio Foundry & Mfg. Co., Steubenville, O.
- Palmer Mfg. Co., Phoenix, Ariz.
- Payne Furnace Div., Affiliated Gas Equipment, Inc., Monrovia, Calif.
- Polaire Cooler Co., Inc., Phoenix, Ariz.
- Rheem Mfg. Co., New York, N. Y.
- Rhode Island Humidifier & Ventilator Co., Boston, Mass.
- Royal Heaters Inc., Alhambra, Calif.
- Steamaire Co., Cincinnati, O.
- ● Trane Co., The, La Crosse, Wis.
- ● Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
- United Electric Service Co., Wichita Falls, Tex.
- ● United States Air Conditioning Corp., Minneapolis, Minn.
- Utility Appliance Corp., Los Angeles, Calif.
- Western Blower Co., Seattle, Wash.
- X L Refrigerating Co., Chicago, Ill.

UNITS, AIR CONDITIONING, SUMMER, ROOM TYPE, FLOOR CABINET, REMOTE COMPRESSOR OR COLD WATER, UNDER 3 TONS CAPACITY

Self contained blower, coil, filter unit for connection to remote compressor or cold water supply

- Airtemp, Div. of Chrysler Corp., Dayton, O.
- ● Carrier Corp., Syracuse, N. Y.
- Frigidaire Div., General Motors Corp., Dayton, O.
- General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
- Giant Mfg. Co., Council Bluffs, Ia.
- Hastings Air Conditioning Co., Hastings, Neb.
- Ilg Electric Ventilating Co., Chicago, Ill.
- Jaden Mfg. Co., Hastings, Neb.
- Kauffman Air Conditioning Corp., St. Louis, Mo.
- ● Kennard Corp., St. Louis, Mo.
- McQuay, Inc., Minneapolis, Minn.
- Nat Corp., Kansas City, Mo.
- Norwin Co., Freeport, Ill.
- Refrigeration Appliances, Inc., Chicago, Ill.
- Refrigeration Economics Co., Inc., Canton O.
- Rinehart Inc., Richmond, Ind.
- Scott-Newcomb, Inc., St. Louis, Mo.
- Temp-Control Inc., Peoria, Ill.
- ● Trane Co., The, La Crosse, Wis.
- Unified Air Conditioner Co., Duluth, Minn.
- ● United States Air Conditioning Corp., Minneapolis, Minn.
- ● Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
- Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
- X L Refrigerating Co., Chicago, Ill.
- ● York Corp., York, Pa.

UNITS, AIR CONDITIONING, SUMMER, ROOM TYPE, FLOOR CABINET, SELF CONTAINED COMPRESSOR, UNDER 3 HP

Self contained blower, coil, compressor, filter unit

- Airtemp, Div. of Chrysler Corp., Dayton, O.
- Baker Refrigeration Corp., South Windham, Me.
- ● Brunner Mfg. Co., Utica, N. Y.
- ● Carrier Corp., Syracuse, N. Y.
- Controldtemp Equipment Sales Corp., Brooklyn, N. Y.
- ● Fedders-Quigan Corp., Buffalo, N. Y.
- General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
- Ilg Electric Ventilating Co., Chicago, Ill.

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Kauffman Air Conditioning Corp., St. Louis, Mo.
● Marlo Coil Co., St. Louis, Mo.
Nat Corp., Kansas City, Mo.
Pacific Mfg. Co., Cleveland, O.
Philco Corp., Philadelphia, Pa.
● Remington Air Conditioning Div., Remington Corp., Cortland, N. Y.
Rinehart Inc., Richmond, Ind.
Scott-Newcomb, Inc., St. Louis, Mo.
Temp-Control Inc., Peoria, Ill.
● Trane Co., The, LaCrosse, Wis.
● United States Air Conditioning Corp., Minneapolis, Minn.
Viking Mfg. Corp., Cleveland, O.
● Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
● York Corp., York, Pa.

UNITS, AIR CONDITIONING, SUMMER, STORE TYPE, FLOOR CABINET, SELF CONTAINED COMPRESSOR, 3 HP AND OVER

Self contained blower, coil, compressor, filter unit with air discharge approximately 6 ft above floor

Airtemp, Div. of Chrysler Corp., Dayton, O.
American Thermal Industries, Inc., Detroit, Mich.
Baker Refrigeration Corp., South Windham, Me.
● Brunner Mfg. Co., Utica, N. Y.
● Carrier Corp., Syracuse, N. Y.
● Clarage Fan Co., Kalamazoo, Mich.
Controldtemp Equipment Sales Corp., Brooklyn, N. Y.
● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
● Frick Co., Waynesboro, Pa.
Frigidaire Div., General Motors Corp., Dayton, O.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Engineering & Mfg. Co., St. Louis, Mo.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
● Governair Corp., Oklahoma City, Okla.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Nat Corp., Kansas City, Mo.
Nevinger Mfg. Co., Inc., Greenville, Ill.
Refrigeration Appliances, Inc., Chicago, Ill.
Rinehart Inc., Richmond, Ind.
Scott-Newcomb, Inc., St. Louis, Mo.
Sterling Air Conditioning Corp., Washington, D. C.
Temp-Control Inc., Peoria, Ill.
● Trane Co., The, LaCrosse, Wis.
● Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
● United Conditioning Corp., New York, N. Y.
● United States Air Conditioning Corp., Minneapolis, Minn.
Viking Mfg. Corp., Cleveland, O.
● Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Worthington Pump & Machinery Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
● York Corp., York, Pa.

UNITS, AIR CONDITIONING, WINTER, ROOM TYPE, FLOOR CABINET

Self contained blower, filter, heating coil, humidifier unit

● Air & Refrigeration Corp., New York, N. Y.
● Aladdin Heating Corp., Oakland, Calif.
Auburn Burner Co., Auburn, Ind.
Baker Refrigeration Corp., South Windham, Me.
Bryant Industrial Div., Affiliated Gas Equipment Co., Inc., Cleveland, O.
● Buffalo Forge Co., Buffalo, N. Y.
● Campbell Heating Co., Des Moines, Ia.
● Carrier Corp., Syracuse, N. Y.
Circulators & Devices Mfg. Corp., New York, N. Y.
● Clarage Fan Co., Kalamazoo, Mich.
Dalzen Tool & Mfg. Co., Detroit, Mich.
Drayer & Hanson, Inc., Los Angeles, Calif.
Ilg Electric Ventilating Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kehm Corp., The, Chicago, Ill.
● Kennard Corp., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
Refrigeration Economics Co., Inc., Canton, O.
Reznor Mfg. Co., Mercer, Pa.
Somers, Inc., H. J., Detroit, Mich.
● Surface Combustion Corp., Toledo, O.
● Trane Co., The, La Crosse, Wis.
● Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
Unified Air Conditioner Co., Duluth, Minn.
● United States Air Conditioning Corp., Minneapolis, Minn.
United States Radiator Corp., Detroit, Mich.
Viking Mfg. Corp., Cleveland, O.
● Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
● York Corp., York, Pa.

UNITS, AIR CONDITIONING, YEAR AROUND, ROOM TYPE, FLOOR CABINET

Self contained blower, cooling and heating coil, filter, humidifier unit for connection to remote compressor or cold water supply, and steam or hot water supply

● Air & Refrigeration Corp., New York, N. Y.
Airtemp, Div. of Chrysler Corp., Dayton, O.
Auburn Burner Co., Auburn, Ind.
● Buffalo Forge Co., Buffalo, N. Y.
● Bush Mfg. Co., West Hartford, Conn.
● Carrier Corp., Syracuse, N. Y.
● Clarage Fan Co., Kalamazoo, Mich.
● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Drayer & Hanson, Inc., Los Angeles, Calif.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Engineering & Mfg. Co., St. Louis, Mo.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Hastings Air Conditioning Co., Hastings, Neb.
Ilg Electric Ventilating Co., Chicago, Ill.
Jaden Mfg. Co., Hastings, Neb.
Johnson Co., S. T., Philadelphia, Pa.
Kauffman Air Conditioning Corp., St. Louis, Mo.
● Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
● Marlo Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
Nat Corp., Kansas City, Mo.
● Niagara Blower Co., New York, N. Y.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
● Remington Air Conditioning Div., Remington Corp., Cortland, N. Y.
Temp-Control Inc., Peoria, Ill.
● Trane Co., The, La Crosse, Wis.
● Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
Unified Air Conditioner Co., Duluth, Minn.
● United States Air Conditioning Corp., Minneapolis, Minn.
Viking Mfg. Corp., Cleveland, O.
● Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
● York Corp., York, Pa.

UNITS, CONDENSATE DISPOSAL, FOR AIR CONDITIONING EQUIPMENT

Eastern Industries, Inc., New Haven, Conn.
Little Giant Vaporizer Co., Inc., Oklahoma City, Okla.

UNITS, COOLING, WINDOW TYPE

Airtemp, Div. of Chrysler Corp., Dayton, O.
● Carrier Corp., Syracuse, N. Y.
Climax Machinery Co., Indianapolis, Ind.
● Fedders-Quigan Corp., Buffalo, N. Y.
Frigidaire Div., General Motors Corp., Dayton, O.
Mitchell Mfg. Co., Chicago, Ill.
National Engineering & Mfg. Co., Kansas City, Mo.
National Gas Equipment Co., Inc., Terrell, Tex.
Pacific Mfg. Co., Cleveland, O.
Pleasantaire Corp., Washington, D. C.
● Remington Air Conditioning Div., Remington Corp., Cortland, N. Y.
Sterling Air Conditioning Corp., Washington, D. C.
● United States Air Conditioning Corp., Minneapolis, Minn.
Viking Mfg. Corp., Cleveland, O.
● York Corp., York, Pa.

UNITS, FUEL OIL, HEATING, PUMPING AND STRAINING

Automatic Products Co., Milwaukee, Wis.
● Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Drying Systems, Inc., Chicago, Ill.
Engineer Co., New York, N. Y.
Faber Engineering Co., Philadelphia, Pa.
Foster Pump Wks., Inc., Brooklyn, N. Y.
Graham Mfg. Co., Inc., New York, N. Y.
National Airoil Burner Co., Inc., Philadelphia, Pa.
Peabody Engineering Corp., New York, N. Y.
Todd Shipyards Corp., Combustion Equipment Div., Elmhurst, L. I., N. Y.
Viking Pump Co., Cedar Falls, Ia.

UNITS, STERILIZING, AIR

Air Purification Service, Inc., Newark, N. J.
Frigidaire Div., General Motors Corp., Dayton, O.
Germatrol Corp., Pittsburgh, Pa.
Hanovia Chemical & Mfg. Co., Newark, N. J.
Health Trola Div., Excel Heating & Air Conditioning Co., Chicago, Ill.
Lientz Co., B. P., Kansas City, Mo.
National Air Conditioning Inc., Johnstown, Pa.
Pittsburgh Chemical Laboratories, Inc., Pittsburgh, Pa.
Robertson Sons, Inc., M. F., Lansdowne, Pa.

UNITS, WINDOW VENTILATOR AND FILTER

Airgard Mfg. Co., Chicago, Ill.
American Air Conditioning Co., Detroit, Mich.

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American Coolair Corp., Jacksonville, Fla.
Bern's Mfg. Co., Chicago, Ill.
Circulators & Devices Mfg. Corp., New York, N. Y.
Goettl Bros. Metal Prod., Inc., Phoenix, Ariz.
Health Trola Div., Excel Heating & Air Conditioning Co., Chicago, Ill.
Ilg Electric Ventilating Co., Chicago, Ill.
Kaiser Co., H. S., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Meier Electric & Machine Co., Inc., Indianapolis, Ind.
Mellish & Murray Co., Chicago, Ill.
Reed Unit-Fans, Inc., New Orleans, La.
Reliable Metal Engineering Co., Chicago, Ill.
Schwitzer-Cummins Co., Indianapolis, Ind.
Somers Inc., H. J., Detroit, Mich.
Standard Electric Mfg. Co., West Berlin, N. J.
Unified Air Conditioner Co., Duluth, Minn.
● United States Air Conditioning Corp., Minneapolis, Minn.
Utility Appliance Corp., Los Angeles, Calif.

UNIVERSAL JOINTS

See Joints, Universal, for Operating Valves

VACUUM CLEANERS FOR BOILERS

See Cleaners, Vacuum, for Boilers

VACUUM GAGES

See Gages, Indicating, Vacuum

VACUUM HEATING SYSTEMS

See Systems, Heating, Vacuum

VACUUM PUMPS

See Pumps, Vacuum

VACUUM RECORDERS

See Recorders, Pressure and Vacuum

VALVE OPERATORS

See Operators, Valve

VALVE RESEATERS

See Reseaters, Valve

VALVES, AIR OPERATING

Bailey Co., Chas. M., San Francisco, Calif.
Belfield Valve, Div. of Minneapolis-Honeywell, Philadelphia, Pa.
Bellows Co., Akron, O.
Bristol Co., The, Waterbury, Conn.
Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Clark Controller Co., Cleveland, O.
Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Davis Regulator Co., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
● Gotham Instrument Co., Inc., New York, N. Y.
Grove Regulator Co., Oakland, Calif.
Hammel-Dahl Co., Providence, R. I.
Hunt & Son, Inc., C. B., Salem, O.
● Illinois Engineering Co., Chicago, Ill.
Keller Tool Co., Grand Haven, Mich.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Valves, Inc., Div. of Hamilton-Thomas Corp., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
McAlear Mfg. Co., Chicago, Ill.
Paul Valve Corp., New York, N. Y.
Powell Co., Wm., The, Cincinnati, O.
R-S Products Corp., Philadelphia, Pa.
Saval, Inc., Los Angeles, Calif.
Schade Valve Mfg. Co., Philadelphia, Pa.
Tagliabue Corp., C. J., Newark, N. J.
Wilson Engineering Corp., Chicago, Ill.

VALVES, ANGLE

Alloy Steel Products Co., Linden, N. J., (Stainless steel)
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Beckett & Co., Inc., Thomas, Dallas, Tex.
Belfield Valve Div. of Minneapolis-Honeywell, Philadelphia, Pa.
Belknap Mfg. Co., Bridgeport, Conn.
Bordo Co., Inc., L. J., Glenside, Pa. (Plug)
Central Brass Mfg. Co., Cleveland, O.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Cleveland Brass Mfg. Co., The, Cleveland, O.
Cooper Alloy Foundry Co., The, Hillside, N. J.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Detroit Brass & Malleable Wks., Detroit, Mich.
De Zurik Shower Co., Sartell, Minn.
● Duriron Co., The, Dayton, O.
Edward Valves, Inc., East Chicago, Ind.
● Fairbanks Co., New York, N. Y.
Farris Engineering Corp., Palisades Park, N. J.
● Grinnell Co., Inc., Providence, R. I.
Grove Regulator Co., Oakland, Calif.
Hammel-Dahl Co., Providence, R. I.
Hasco Valve & Machine Co., Milwaukee, Wis.
● Henry Valve Co., Melrose Park, Ill.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Jacuzzi Bros., Inc., Richmond, Calif.
Jarecki Mfg. Co., Erie, Pa.
● Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Klingerit, Inc., New York, N. Y.
Kunkle Valve Co., Ft. Wayne, Ind.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
● Lunkenheimer Co., Cincinnati, O.
Luzerne Rubber Co., Trenton, N. J. (Hard Rubber)
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
● Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
Marsh Valve Co., Dunkirk, N. Y.
McAlear Mfg. Co., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Morse-Smith-Morse, Inc., Watertown, Mass.
Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
OPW Corp., Cincinnati, O.
Ohio Brass Co., Mansfield, O.
● Ohio Injector Co., Wadsworth, O.
Parker Appliance Co., The, Cleveland, O.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Powell Co., Wm., Cincinnati, O.
● Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
● Sarcotherm Controls, Inc., New York, N. Y.
Schaible Co., The, Cincinnati, O.
Schutte & Koerting Co., Philadelphia, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
● Sterling, Inc., Milwaukee, Wis.
Stockham Valves & Fittings, Birmingham, Ala.
Vacuum-Electronic Engineering Co., Brooklyn, N. Y.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
Welsbach Corp., The, Kitson Div., Philadelphia, Pa.
White Flomatic Corp., Hoosick Falls, N. Y.
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.

VALVES, BALANCING, FOR FORCED HOT WATER HEATING SYSTEMS

● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
● Detroit Lubricator Co., Detroit, Mich.
G & H Mfg. Co., Philadelphia, Pa.
Hammond Brass Works, Hammond, Ind.
● Hoffman Specialty Co., Indianapolis, Ind.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Marsh Valve Co., Dunkirk, N. Y.
Ohio Brass Co., Mansfield, O.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
Schaible Co., The, Cincinnati, O.
● Trane Co., The, La Crosse, Wis.

VALVES, BAR STOCK

Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Grove Regulator Co., Oakland, Calif.
Guardian Products Corp., Michigan City, Ind.
Hammel-Dahl Co., Providence, R. I.
Kerotest Mfg. Co., Pittsburgh, Pa.
● Lunkenheimer Co., Cincinnati, O.
Paul Valve Corp., New York, N. Y.
Pittsburgh Valve & Fittings Co., Barberton, O.
Powell Co., Wm., The, Cincinnati, O.
● Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Vacuum-Electronic Engineering Co., Brooklyn, N. Y.
● Walworth Co., New York, N. Y.
Welsbach Corp., The, Kitson Div., Philadelphia, Pa.
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.

VALVES, BLOW-OFF

Barrett Machine Co., Pittsburgh, Pa.
Bordo Co., Inc., L. J., Glenside, Pa.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Cochrane Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.

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Eclipse Fuel Engineering Co., Rockford, Ill.
Edward Valves, Inc., East Chicago, Ind.
Everlasting Valve Co., Jersey City, N. J.
● Fairbanks Co., New York, N. Y.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Jarecki Mfg. Co., Erie, Pa.
● Jenkins Bros., New York, N. Y.
Keckley Co., O. C., Chicago, Ill.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
● Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
● McDonnell & Miller, Inc., Chicago, Ill.
Norgren Co., C. A., Denver, Colo.
● Ohio Injector Co., Wadsworth, O.
Parker Appliance Co., The, Cleveland, O.
Paul Valve Corp., New York, N. Y.
Powell Co., Wm., Cincinnati, O.
Schade Valve Mfg. Co., Philadelphia, Pa.
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.
Wilson Engineering Corp., Chicago, Ill.
● Yarnall-Waring Co., Philadelphia, Pa.

VALVES, BUTTERFLY

Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Conoflow Corp., Philadelphia, Pa.
● Crane Co., Chicago, Ill.
Davis Regulator Co., Chicago, Ill.
Fischer & Porter Co., Hatboro, Pa.
● General Controls Co., Glendale, Calif.
Hammel-Dahl Co., Providence, R. I.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Ohio Injector Co., Wadsworth, O.
Powell Co., Wm., The, Cincinnati, O.
R-S Products Corp., Philadelphia, Pa.
Rockwell Co., W. S., Fairfield, Conn.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Tri-Clover Machine Co., Kenosha, Wis.

VALVES, CHECK

Alloy Steel Products Co., Linden, N. J. (Stainless steel)
American Hard Rubber Co., New York, N. Y. (Rubber lined)
Aminco Refrigeration Products Co., Detroit, Mich.
Amp Corp., St. Louis, Mo.
Barrett, Haentjens & Co., Hazleton, Pa.
Belfield Valve Div. of Minneapolis-Honeywell, Philadelphia, Pa.
Belknap Mfg. Co., Bridgeport, Conn.
Catawissa Valve & Fittings Co., Catawissa, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Cochrane Corp., Philadelphia, Pa.
Cooper Alloy Foundry Co., The, Hillside, N. J.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Detroit Brass & Malleable Wks., Detroit, Mich.
Durabla Mfg. Co., New York, N. Y.
Eclipse Fuel Engineering Co., Rockford, Ill.
Eddy Valve Co., Waterford, N. Y.
Edward Valves, Inc., East Chicago, Ind.
● Fairbanks Co., New York, N. Y.
Foster Engineering Co., Union, N. J.
● Frick Co., Waynesboro, Pa.
Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
● General Ceramics & Steatite Corp., Keasbey, N. J. (chemical stoneware)
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Greer Hydraulics, Inc., Brooklyn, N. Y.
● Grinnell Co., Inc., Providence, R. I.
Grove Regulator Co., Oakland, Calif.
Hammond Brass Works, Hammond, Ind.
Hasco Valve & Machine Co., Milwaukee, Wis. (alloy)
● Henry Valve Co., Melrose Park, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Jacuzzi Bros., Inc., Richmond, Calif.
Jarecki Mfg. Co., Erie, Pa.
● Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Kunkle Valve Co., Fort Wayne, Ind.
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead lined)
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
● Lunkenheimer Co., Cincinnati, O.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Mansfield & Green, Cleveland, O.
Milwaukee Valve Co., Milwaukee, Wis.
Morse-Smith-Morse, Inc., Watertown, Mass.
Mueller Brass Co., Port Huron, Mich.
Norgren Co., C. A., Denver, Colo.
Northern Indiana Brass Co., Elkhart, Ind.
OPW Corp., Cincinnati, O.
Ohio Brass Co., Mansfield, O.
● Ohio Injector Co., Wadsworth, O.
Parker Appliance Co., The, Cleveland, O.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Pokorney Mfg. Co., Chicago, Ill.
Powell Co., Wm., Cincinnati, O.
Preferred Utilities Mfg. Corp., New York, N. Y.
● Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Rensselaer Valve Co., Cohoes, N. Y.
Ruggles-Klingemann Mfg. Co., Salem, Mass. (Bleeder type)
Schutte & Koerting Co., Philadelphia, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Shank Co., Cyrus, Chicago, Ill.
Smolensky Valve Co., Inc., Bedford, O.
Stockham Valves & Fittings, Birmingham, Ala.
Stokes Molded Products, Inc., Trenton, N. J. (Hard rubber)
● Strong, Carlisle & Hammond Co., Cleveland, O.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
● Watson-Stillman Co., Roselle, N. J. (hydraulic service)
White Flomatic Corp., Hoosick Falls, N. Y.
Whittaker Co., Wm. R., Los Angeles, Calif.
Williams Gauge Co., The, Pittsburgh, Pa. (Noiseless)
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.

VALVES, COMPRESSOR

Baker Refrigeration Corp., South Windham, Me.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Chicago Seal Co., Chicago, Ill.
Detroit Stamping Co., Detroit, Mich.
Durabla Mfg. Co., New York, N. Y.
Electric Sprayit Co., The, Sheboygan, Wis.
● Frick Co., Waynesboro, Pa.
● Henry Valve Co., Melrose Park, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
● Jenkins Bros., New York, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
● Lunkenheimer Co., Cincinnati, O.
Mueller Brass Co., Port Huron, Mich.
OPW Corp., Cincinnati, O.
● Ohio Injector Co., Wadsworth, O.
Voss Co., J. H. H., Inc., New York, N. Y.

VALVES, DIAPHRAGM

American Hard Rubber Co., New York, N. Y. (Rubber lined)
Atlas Valve Co., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif:
Belfield Valve Div. of Minneapolis-Honeywell, Philadelphia, Pa.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Bristol Co., The, Waterbury, Conn.
● Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
● Duriron Co., Inc., The, Dayton, O.
Eclipse Fuel Engineering Co., Rockford, Ill.
Farris Engineering Corp., Palisades Park, N. J.
Fischer & Porter Co., Hatboro, Pa.
● Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Foxboro Co., Foxboro, Mass.
Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
Gates Engineering Co., Wilmington, Del.
General Ceramics & Steatite Corp., Keasbey, N. J. (Chemical stoneware)
● General Controls Co., Glendale, Calif.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
● Grinnell Co., Providence, R. I.
Grove Regulator Co., Oakland, Calif.
Hagan Corp., Pittsburgh, Pa.
Hammel-Dahl Co., Providence, R. I.
● Henry Valve Co., Melrose Park, Ill.
Hubbell Corp., Chicago, Ill.
Hunt & Son, Inc., C. B., Salem, O.
● Illinois Engineering Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
● Johnson Service Co., Milwaukee, Wis.
Kainer & Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Valves, Inc., Div. of Hamilton-Thomas Corp., Hamilton, O.
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead lined)
Leslie Co., Lyndhurst, N. J.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
● Minneapolis-Honeywell Regulator Co.. Minneapolis, Minn.
Mueller Brass Co., Port Huron, Mich.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
● National Radiator Co., The, Johnstown, Pa.
Norgren Co., C. A., Denver, Colo.
North American Mfg. Co., Cleveland, O.
Parks-Cramer Co., Fitchburg, Mass.

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Paul Valve Corp., New York, N. Y.
Penn Industrial Equipment Corp., Philadelphia, Pa.
● Powers Regulator Co., Chicago, Ill.
R-S Products Corp., Philadelphia, Pa.
Ross Valve Mfg. Co., Inc., Troy, N. J.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
Schade Valve Mfg. Co., Philadelphia, Pa.
● Spence Engineering Co., Inc., Walden, N. Y.
Staples & Pfeiffer, San Francisco, Calif.
● Swartwout Co., Cleveland, O.
Tagliabue Corp., C. J., Newark, N. J.
● Taylor Instrument Companies, Rochester, N. Y.
● Trane Co., The, La Crosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Triplex Heating Specialty Co., Inc., Peru, Ind.
United States Rubber Co., New York, N. Y.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
Welsbach Corp., The, Kitson Div., Philadelphia, Pa.
● White-Rodgers Electric Co., St. Louis, Mo.

VALVES, FIRE PROTECTION, SPRINKLER SYSTEM CONTROL

Barber-Colman Co., Rockford, Ill.
● Crane Co., Chicago, Ill.
Everlasting Valve Co., Jersey City, N. J.
● Fairbanks Co., New York, N. Y.
● Grinnell Co., Inc., Providence, R. I.
Grove Regulator Co., Oakland, Calif.
Hodgman Mfg. Co., Taunton, Mass.
● Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
● Ohio Injector Co., Wadsworth, O.
Raisler Corp., Grimes Sprinkler Div., New York, N. Y.
● Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Rockwood Sprinkler Co., Worcester, Mass.

VALVES, FLOAT

● Alco Valve Co., St. Louis, Mo.
American Hard Rubber Co., New York, N. Y. (Hard rubber)
Atlas Valve Co, Newark, N. J.
Automatic Products Co., Milwaukee, Wis. (Oil)
Bailey Co., Chas. M., San Francisco, Calif.
Beckett & Co., Inc., Thomas, Dallas, Tex.
Belfield Valve Div. of Minneapolis-Honeywell, Philadelphia, Pa.
Boylston Steam Specialty Co., Chicago, Ill.
Caldwell Co., W. E., Louisville, Ky.
● Cash Co., A. W., Decatur, Ill.
Central Brass Mfg. Co., Cleveland, O.
Cleveland Humidifier Co., Cleveland, O.
Cochrane Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Darling Valve & Mfg. Co., Williamsport, Pa.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
● Detroit Lubricator Co., Detroit, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Eddy Valve Co., Waterford, N. Y.
● Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
● Frick Co., Waynesboro, Pa.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Regulator Co., Oakland, Calif.
Hubbell Corp., Chicago, Ill.
● Illinois Engineering Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Valves, Inc., Div. of Hamilton-Thomas Corp., Hamilton, O.
Locke Regulator Co., Salem, Mass.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
● Maid-O'-Mist, Inc., Chicago, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
Monash-Younker Co., Chicago, Ill.
Morey, Dan, Los Angeles, Calif.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Perfex Corp., Milwaukee, Wis.
Phillips & Co., H. A., Chicago, Ill.
R-S Products Corp., Philadelphia, Pa.
Robert Mfg. Co., Los Angeles, Calif.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
Schade Valve Mfg. Co., Philadelphia, Pa.
Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
Schutte & Koerting Co., Philadelphia, Pa.
Skuttle Mfg. Co., Detroit, Mich.
● Spence Engineering Co., Inc., Walden, N. Y.
● Sterling, Inc., Milwaukee, Wis.
Stickle Steam Specialities Co., Indianapolis, Ind.
● Swartwout Co., Cleveland, O.
Viking Air Conditioning Corp., Cleveland, O.
Watts Regulator Co., Lawrence, Mass.
● Whittington Pump & Engineering Corp., Indianapolis, Ind.

VALVES, FLOW CONTROL, FOR HOT WATER HEATING SYSTEMS

Barber-Colman Co., Rockford, Ill.
● Bell & Gossett Co., Morton Grove, Ill.
Hammel-Dahl Co., Providence, R. I.
Hook & Ackerman, Inc., New York, N. Y.
● Illinois Engineering Co., Chicago, Ill.
Kainer & Co., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Quality Specialty Co., Inc., Philadelphia, Pa.
Sall Bros. Co., Rockford, Ill.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
Schaible Co., The, Cincinnati, O.
Taco Heaters, Inc., Providence, R. I.
● Thrush & Co., H. A., Peru, Ind.
● Trane Co., The, La Crosse, Wis.
Triplex Heating Specialty Co., Inc., Peru, Ind.
W-H Engineering Co., Chicago, Ill.
White Flomatic Corp., Hoosick Falls, N. Y.
Yula Water Heaters Inc., New York, N. Y.

VALVES, FORGED STEEL

Catawissa Valve & Fittings Co., Catawissa, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Conoflow Corp., Philadelphia, Pa.
● Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Edward Valves, Inc., East Chicago, Ind.
Grove Regulator Co., Oakland, Calif.
● Henry Valve Co., Melrose Park, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
● Ohio Injector Co., Wadsworth, O.
Parker Appliance Co., The, Cleveland, O.
Paul Valve Corp., New York, N. Y.
R-S Products Corp., Philadelphia, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Vogt Machine Co., Henry, Louisville, Ky.
● Watson-Stillman Co., Roselle, N. J.

VALVES, GATE, ALLOY

Alloy Steel Products Co., Linden, N. J.
Cooper Alloy Foundry Co, The, Hillside, N J.
● Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Edward Valves, Inc., East Chicago, Ind.
Electric Steel Foundry Co., Portland, Ore.
Hasco Valve & Machine Co., Milwaukee, Wis.
Hydro-Aire, Inc., Burbank, Calif.
● Jenkins Bros., New York, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
● Lunkenheimer Co., Cincinnati, O.
Milwaukee Valve Co., Milwaukee, Wis.
● Ohio Injector Co., Wadsworth, O.
Powell Co., Wm., Cincinnati, O.
● Walworth Co., New York, N. Y.
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.
Whittaker Co., Wm. R., Los Angeles, Calif.

VALVES, GATE, BRASS AND BRONZE

Belknap Mfg. Co., Bridgeport, Conn.
Bordo Co., Inc., L. J., Glenside, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Darling Valve Mfg. Co., Williamsport, Pa.
● Detroit Brass & Malleable Wks., Detroit, Mich.
Detroit Lubricator Co., Detroit, Mich.
Eddy Valve Co., Waterford, N. Y.
Everlasting Valve Co., Jersey City, N. J.
● Fairbanks Co., New York, N. Y.
Hammond Brass Wks., Hammond, Ind.
Jarecki Mfg. Co., Erie, Pa.
● Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Lead Lined Iron Pipe Co., Wakefield, Mass. (Tin lined)
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
● Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Milwaukee Valve Co., Milwaukee, Wis.
Morrison Brothers Co., Dubuque, Ia.
Northern Indiana Brass Co., Elkhart, Ind.
OPW Corp., Cincinnati, O.
Ohio Brass Co., Mansfield, O.
● Ohio Injecter Co., Wadsworth, O.
Ostlind Valve, Inc., Portland, Ore.
Pittsburgh Valve & Fittings Co., Barberton, O
Powell Co., Wm., Cincinnati, O.

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● Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Rensselaer Valve Co., Cohoes, N. Y.
Schaible Co., The, Cincinnati, O.
Scott Valve Mfg. Co., Detroit, Mich.
Stockham Valves & Fittings, Birmingham, Ala.
● Walworth Co., New York, N. Y.
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.

VALVES, GATE, IRON BODY

Bordo Co., Inc., L. J., Glenside, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
● Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Eclipse Fuel Engineering Co., Rockford, Ill.
Eddy Valve Co., Waterford, N. Y.
Everlasting Valve Co., Jersey City, N. J.
● Fairbanks Co., New York, N. Y.
Jarecki Mfg. Co., Erie, Pa.
● Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead and tin lined)
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
● Lunkenheimer Co., Cincinnati, O.
Mueller Co., Decatur, Ill.
● Ohio Injector Co., Wadsworth, O.
Pittsburgh Valve & Fittings Co., Barberton, O.
Powell Co., Wm., Cincinnati, O.
● Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Rensselaer Valve Co., Cohoes, N. Y.
Scott Valve Mfg. Co., Detroit, Mich.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Stockham Valves & Fittings, Birmingham, Ala.
● Walworth Co., New York, N. Y.
Whittaker Co., Wm. R., Los Angeles, Calif.
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.

VALVES, GATE, MALLEABLE IRON

Bordo Co., Inc., L. J., Glenside, Pa.
● Crane Co., Chicago, Ill.
Powell Co., Wm., Cincinnati, O.

VALVES, GATE, STEEL

Bordo Co., Inc., L. J., Glenside, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
● Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
De Zurik Shower Co., Sartell, Minn.
Edward Valves, East Chicago, Ind.
Everlasting Valve Co., Jersey City, N. J.
Hamer Oil Tool Co., Long Beach, Calif.
● Jenkins Bros., New York, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
● Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
● Ohio Injector Co., Wadsworth, O.
Pittsburgh Valve & Fittings Co., Barberton, O.
Powell Co., Wm., Cincinnati, O.
Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
Whittaker Co., Wm. R., Los Angeles, Calif.

VALVES, GLOBE, ALLOY

Alloy Steel Products Co., Linden, N. J.
Cooper Alloy Foundry Co., The, Hillside, N. J.
● Crane Co., Chicago, Ill.
Edward Valves, Inc., East Chicago, Ind.
Electric Steel Foundry Co., Portland, Ore.
Grove Regulator Co., Oakland, Calif.
Hammel-Dahl Co., Providence, R. I.
Hasco Valve & Machine Co., Milwaukee, Wis.
● Henry Valve Co., Melrose Park, Ill.
● Jenkins Bros., New York, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Klingerit, Inc., New York, N. Y.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Milwaukee Valve Co., Milwaukee, Wis.
● Ohio Injector Co., Wadsworth, O.
Powell Co., Wm., Cincinnati, O.
● Walworth Co., New York, N. Y.
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.

VALVES, GLOBE, BRASS AND BRONZE

Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Belknap Mfg. Co., Bridgeport, Conn.
Bowser, Inc., Fort Wayne, Ind.
California Brass Mfg. Co., Los Angeles, Calif.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Cleveland Brass Mfg. Co., The, Cleveland, O.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Detroit Brass & Malleable Wks., Detroit, Mich.
● Detroit Lubricator Co., Detroit, Mich.
Fairbanks Co., New York, N. Y.
● Grinnell Co., Inc., Providence, R. I.
Grove Regulator Co., Oakland, Calif.
Hammond Brass Wks., Hammond, Ind.
● Henry Valve Co., Melrose Park, Ill.
Jarecki Mfg. Co., Erie, Pa.
● Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Klingerit, Inc., New York, N. Y.
Kunkle Valve Co., Ft. Wayne, Ind.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
● Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Marsh Valve Co., Dunkirk, N. Y.
Milwaukee Valve Co., Milwaukee, Wis.
Morse-Smith-Morse, Inc., Watertown, Mass.
Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
OPW Corp., Cincinnati, O.
Ohio Brass Co., Mansfield, O.
● Ohio Injector Co., Wadsworth, O.
Ostlind Valve, Inc., Portland, Ore.
Parker Appliance Co.. The, Cleveland, O.
Pittsburgh Valve & Fittings Co., Barberton, O.
Powell Co., Wm., Cincinnati, O.
● Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
Stockham Valves & Fittings, Birmingham, Ala.
● Walworth Co., New York, N. Y.
White Flomatic Corp., Hoosick Falls, N. Y.
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.

VALVES, GLOBE, IRON BODY

Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Belfield Valve Div. of Minneapolis-Honeywell, Philadelphia, Pa.
● Crane Co., Chicago, Ill.
● Fairbanks Co., New York, N. Y.
● Frick Co., Waynesboro, Pa.
● Grinnell Co., Inc., Providence, R. I.
● Henry Valve Co., Melrose Park, Ill.
Jarecki Mfg. Co., Erie, Pa.
● Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Klingerit, Inc., New York, N. Y.
Kunkle Valve Co., Ft. Wayne, Ind.
● Lunkenheimer Co., Cincinnati, O.
● Ohio Injector Co., Wadsworth, O.
Pittsburgh Valve & Fittings Co., Barberton, O.
Powell Co., Wm., Cincinnati, O.
● Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
Shank Co., Cyrus, Chicago, Ill.
Stockham Valves & Fittings, Birmingham, Ala.
● Walworth Co., New York, N. Y.
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.

VALVES, GLOBE, MALLEABLE IRON

● Crane Co., Chicago, Ill.
Powell Co., Wm., Cincinnati, O.

VALVES, GLOBE, STEEL

Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Belfield Valve Div. of Minneapolis-Honeywell, Philadelphia, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
● Crane Co., Chicago, Ill.
De Zurik Shower Co., Sartell, Minn.
Edward Valves, Inc., East Chicago, Ind.
Grove Regulator Co., Oakland, Calif.
● Henry Valve Co., Melrose Park, Ill.
● Jenkins Bros., New York, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Klingerit, Inc., New York, N. Y.
Kunkle Valve Co., Ft. Wayne, Ind.
● Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
● Ohio Injector Co., Wadsworth, O.
Ostlind Valve, Inc., Portland, Ore.
Parker Appliance Co., The, Cleveland, O.
Powell Co., Wm., Cincinnati, O.
● Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Shank Co., Cyrus, Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
● Watson-Stillman Co., Roselle, N. Y.

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VALVES, LINED

American Hard Rubber Co., New York, N. Y. (Rubber lined)
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Conoflow Corp., Philadelphia, Pa.
● Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
De Zurik Shower Co., Sartell, Minn.
Division Lead Co., Chicago, Ill.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
● General Controls Co., Glendale, Calif.
Goodrich Co., B. F., Akron, O. (Rubber lined)
● Grinnell Co., Inc., Providence, R. I.
Grove Regulator Co., Oakland, Calif.
Hasco Valve & Machine Co., Milwaukee, Wis. (Rubber)
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead lined)
National Lead Co., New York, N. Y. (Lead)
Paul Valve Corp., New York, N. Y.
R-S Products Corp., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J. (Rubber)
Resisto Pipe & Valve Co., East Cambridge, Mass. (Lead)
United States Rubber Co., New York, N. Y.
United States Stoneware Co., New York, N. Y.

VALVES, MIXING, HOT AND COLD WATER

Bailey Co., Chas. M., San Francisco, Calif.
● Bell & Gossett Co., Morton Grove, Ill.
● Crane Co., Chicago, Ill.
● Dole Valve Co., The, Chicago, Ill.
● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
General Fittings Co., Providence, R. I.
Holby Valve Co., New York, N. Y.
Lawler Automatic Controls, Inc., Mount Vernon, N. Y.
Leonard Valve Co., Providence, R. I.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
● Powers Regulator Co., Chicago, Ill.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
Schaible Co., The, Cincinnati, O.
Taco Heaters, Inc., Providence, R. I.
Vapor Heating Corp., Chicago, Ill.
Watts Regulator Co., Lawrenceville, Mass.
Yula Water Heaters Inc., New York, N. Y.

VALVES, MIXING, STEAM AND WATER

Central Brass Mfg. Co., Cleveland, O.
Cooper Co., Clark, Palmyra, N. J.
● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Hammel-Dahl Co., Providence, R. I.
● Johnson Service Co., Milwaukee, Wis.
Leonard Valve Co., Providence, R. I.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
● Powers Regulator Co., Chicago, Ill.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.

VALVES, MOTOR OPERATED

Armstrong Control Co., Inc., Portland, Ore.
● Autempco Corp., New York, N. Y.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Bailey Co., Chas. M., San Francisco, Calif.
Barber-Colman Co., Rockford, Ill.
● Bell & Gossett Co., Morton Grove, Ill.
Bristol Co., The, Waterbury, Conn.
Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Cochrane Corp., Philadelphia, Pa.
Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Cutler-Hammer, Inc., Milwaukee, Wis.
Darling Valve & Mfg. Co., Williamsport, Pa.
Davis Regulator Co., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Eddy Valve Co., Waterford, N. Y.
Edward Valves, Inc., East Chicago, Ind.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
● General Controls Co., Glendale, Calif.
Hasco Valve & Machine Co., Milwaukee, Wis.
Homestead Valve Mfg. Co., Coraopolis, Pa.
● Illinois Engineering Co., Chicago, Ill.
J O Mfg. Co., South Gate, Calif.
● Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Kieley & Mueller, Inc., North Bergen, N. J.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Mason-Neilan Regulator Co., Boston, Mass.
● Mercoid Corp., Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Nordstrom Valve Div., Rockwell Mfg. Co., Pittsburgh, Pa.
North American Mfg. Co., Cleveland, O.
Paul Valve Corp., New York, N. Y.
Penn Electric Switch Co., Goshen, Ind.
Philadelphia Gear Works, Inc., Philadelphia, Pa.
Powell Co., Wm., Cincinnati, O.
R-S Products Corp., Philadelphia, Pa.
Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Rensselaer Valve Co., Cohoes, N. Y.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
● Sarcotherm Controls, Inc., New York, N. Y.
Saval, Inc., Los Angeles, Calif.
Schutte & Koerting Co., Philadelphia, Pa.
Tagliabue Corp., C. J., Newark, N. J.
Tallmadge & Co., Webster, East Orange, N. J.
● Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
● Webster & Co., Warren, Camden, N. J.
Whittaker Co., Wm. R., Los Angeles, Calif.

VALVES, NEEDLE

Alloy Steel Products Co., Linden, N. J. (Stainless steel).
Automatic Products Co., Milwaukee, Wis. (Oil).
Beckett & Co., Inc., Thomas, Dallas, Tex.
Carpenter Mfg. Corp., The, Cleveland, O. (Stainless steel stem, brass bar stock body)
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Cooper Alloy Foundry Co., The, Hillside, N. J.
Cooper Co., Clark, Palmyra, N. Y.
● Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Detroit Brass & Malleable Wks., Detroit, Mich.
● Detroit Lubricator Co., Detroit, Mich.
Edward Valves, Inc., East Chicago, Ind.
Grove Regulator Co., Oakland, Calif.
Hammel-Dahl Co., Providence, R. I.
● Henry Valve Co., Melrose Park, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
Kerotest Mfg. Co., Pittsburgh, Pa.
Lancaster Heat Transfer Co., Inc., Brooklyn, N. Y.
● Lunkenheimer Co., Cincinnati, O.
● Maid-O'-Mist, Inc., Chicago, Ill.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
McAlear Mfg. Co., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Morrison Brothers Co., Dubuque, Ia.
Norgren Co., C. A., Denver, Colo.
Ohio Brass Co., Mansfield, O.
● Ohio Injector Co., Wadsworth, O.
Parker Appliance Co., The, Cleveland, O.
Patrol Valve Co., The, Cleveland, O.
Powell Co., Wm., Cincinnati, O.
Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Shank Co., Cyrus, Chicago, Ill.
Stockham Valves & Fittings, Birmingham, Ala.
● Strong, Carlisle & Hammond Co., Cleveland, O.
Swift Lubricator Co., Elmira, N. Y.
● Taylor Instrument Companies, Rochester, N. Y.
Vacuum-Electronic Engineering Co., Brooklyn, N. Y.
● Walworth Co., New York, N. Y.
● Watson-Stillman Co., Roselle, N. J. (Hydraulic service)
Webster Electric Co., Racine, Wis. (Pressure regulating valve for oil burners).
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.

VALVES, PLASTIC

Haveg Corp., Newark, Del.

VALVES, PLUG

Altens Foundry & Machine Works, Inc., Lancaster, O.
American Car & Foundry Co., New York, N. Y.
Andale Co., Philadelphia, Pa.
Barrett, Haentjens & Co., Hazleton, Pa.
Barrett Machine Co., Pittsburgh, Pa.
Belfield Valve, Div. of Minneapolis-Honeywell, Philadelphia, Pa.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Bordo Co., Inc., L. J., Glenside, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Cooper Alloy Foundry Co., The, Hillside, N. J.
Cooper Co., Clark, Palmyra, N. J.
● Couplings Co., Chicago, Ill.
● Crane Co., Chicago, Ill.
De Zurik Shower Co., Sartell, Minn. (rubber faced)
● Duriron Co., Inc., Dayton, O. (Acid resisting).
Eddy Valve Co., Waterford, N. Y.
Edward Valves, Inc., East Chicago, Ind.
● Fairbanks Co., New York, N. Y.
General Ceramics & Steatite Corp., Keasbey, N. J. (Chemical stoneware)
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Hamer Oil Tool Co., Long Beach, Calif.
Hasco Valve & Machine Co., Milwaukee, Wis.

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Homestead Valve Mfg. Co., Coraopolis, Pa.
Hydro-Aire, Inc., Burbank, Calif.
Imperial Brass Mfg. Co., Chicago, Ill.
● Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Klingerit, Inc., New York, N. Y.
Knight, Maurice A., Akron, O. (Stoneware).
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber).
Mueller Co., Decatur, Ill.
National Airoil Burner Co., Inc., Philadelphia, Pa.
Nordstrom Valve Div., Rockwell Mfg. Co., Pittsburgh, Pa. (Lubricated).
● Ohio Injector Co., Wadsworth, O.
Ostlind Valve, Inc., Portland, Ore.
Parker Appliance Co., The, Cleveland, O.
Parks-Cramer Co., Fitchburg, Mass. (jacketed)
Pittsburgh Brass Mfg. Co., Pittsburgh, Pa.
Pittsburgh Valve & Fittings Co., Barberton, O.
Porter Co., Inc., H. K., Pittsburgh, Pa.
Powell Co., Wm., Cincinnati, O.
● Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Stockham Valves & Fittings, Birmingham, Ala.
● Taylor Instrument Companies, Rochester, N. Y.
Tri-Clover Machine Co., Kenosha, Wis.
● Walworth Co., New York, N. Y.
Welsbach Corp., The, Kitson Div., Philadelphia, Pa.
Whittaker Co., Wm. R., Los Angeles, Calif.
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.

VALVES, PRESSURE REDUCING AND REGULATING, AIR AND GAS

Atlas Valve Co., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
Belfield Valve Div. of Minneapolis-Honeywell, Philadelphia, Pa.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Boylston Steam Specialty Co., Chicago, Ill.
Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
CCA Products, Inc., Glendale, Calif.
● Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Central Brass Mfg. Co., Cleveland, O.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Clark Mfg. Co., Cleveland, O.
Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Davis Regulator Co., Chicago, Ill.
Defender Instrument & Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
DeVilbiss Co., The, Toledo, O.
Dockson Corp., Detroit, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Electric Sprayit Co., The, Sheboygan, Wis.
● Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
● General Controls Co., Glendale, Calif.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
● Gold Top Heating, Inc., Butte, Mont.
Grove Regulator Co., Oakland, Calif.
Hagan Corp., Pittsburgh, Pa.
Hammel-Dahl Co., Providence, R. I.
Harris Calorific Co., The, Cleveland, O.
● Hoffman Specialty Co., Indianapolis, Ind.
Hubbell Corp., Chicago, Ill.
● Illinois Engineering Co., Chicago, Ill.
Kaye & MacDonald, Inc., West Orange, N. J.
Keckley Co., O. C., Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Valves, Inc., Div. of Hamilton-Thomas Corp., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Liquid Carbonic Corp., The, Chicago, Ill.
Locke Regulator Co., Salem, Mass.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
Modern Engineering Co., St. Louis, Mo.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
National Cylinder Gas Co., Chicago, Ill.
Norgren Co., C. A., Denver, Colo.
Northern Equipment Co., Erie, Pa.
Penn Electric Switch Co., Goshen, Ind.
● Powers Regulator Co., Chicago, Ill.
Roberts-Gordon Appliance Corp., Buffalo, N. Y.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Skaneateles Mfg. Co., Inc., Syracuse, N. Y.
● Spence Engineering Co., Inc., Walden, N. Y.
Squires Co., C. E., Cleveland, O.
Staples & Pfeiffer, San Francisco, Calif.
● Strong, Carlisle & Hammond Co., Cleveland, O.
● Swartwout Co., Cleveland, O.
Tagliabue Corp., C. J., Newark, N. J.
● Taylor Instrument Companies, Rochester, N. Y.
● Thrush & Co., H. A., Peru, Ind.
Trerice Co., H. O., Detroit, Mich.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Tryco Products, Inc., Westfield, Mass.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
Yula Water Heaters, Inc., New York, N. Y.

VALVES, PRESSURE REDUCING AND REGULATING, HOT WATER

Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
● Bell & Gossett Co., Morton Grove, Ill.
Boylston Steam Specialty Co., Chicago, Ill.
● Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
● Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Regulator Co., Oakland, Calif.
Hammel-Dahl Co., Providence, R. I.
● Hoffman Specialty Co., Indianapolis, Ind.
● Illinois Engineering Co., Chicago, Ill.
Kainer & Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Valves, Inc., Div. of Hamilton-Thomas Corp., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Locke Regulator Co., Salem, Mass.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
● Powers Regulator Co., Chicago, Ill.
Republic Flow Meters Co., Chicago, Ill.
Sall Bros. Co., Rockford, Ill.
● Sarcotherm Controls, Inc., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Schaible Co., The, Cincinnati, O.
● Spence Engineering Co., Inc., Walden, N. Y.
Stickle Steam Specialties Co., Indianapolis, Ind.
● Strong, Carlisle & Hammond Co., Cleveland, O.
Taco Heaters, Inc., Providence, R. I.
Tagliabue Corp., C. J., Newark, N. J.
● Taylor Instrument Companies, Rochester, N. Y.
● Thrush & Co., H. A., Peru, Ind.
● Trane Co., The, LaCrosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
White Flomatic Corp., Hoosick Falls, N. Y.
Yula Water Heaters Inc., New York, N. Y.

VALVES, PRESSURE REDUCING AND REGULATING, STEAM

● American District Steam Co., North Tonawanda, N. Y.
● Armstrong Machine Wks., Three Rivers, Mich.
Atlas Valve Co., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Belfield Valve Div. of Minneapolis-Honeywell, Philadelphia, Pa.
Boylston Steam Specialty Co., Chicago, Ill.
Brooke Engineering Co., Inc., Philadelphia, Pa.
● Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Central Brass Mfg. Co., Cleveland, O.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Clark Mfg. Co., Cleveland, O.
Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
● Dunham Co., C. A., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
● Fischer Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
● General Controls Co., Glendale, Calif.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Regulator Co., Oakland, Calif.
Hagan Corp., Pittsburgh, Pa.
Hammel-Dahl Co., Providence, R. I.

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● Hoffman Specialty Co., Indianapolis., Ind.
Hubbell Corp., Chicago, Ill.
● Illinois Engineering Co., Chicago, Ill.
Kaye & MacDonald, Inc., West Orange, N. J.
Keckley Co., O. C., Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Valves, Inc., Div. of Hamilton-Thomas Corp., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Locke Regulator Co., Salem, Mass.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Northern Equipment Co., Erie, Pa.
● Powers Regulator Co., Chicago, Ill.
Republic Flow Meters Co., Chicago, Ill.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
● Sarcotherm Controls, Inc., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
● Spence Engineering Co., Inc., Walden, N. Y.
Squires Co., C. E., Cleveland, O.
Staples & Pfeiffer, San Francisco, Calif.
Stickle Steam Specialties Co., Indianapolis, Ind.
● Strong, Carlisle & Hammond Co., Cleveland, O.
● Swartwout Co., Cleveland, O.
Tagliabue Corp., C. J., Newark, N. J.
● Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Vapor Heating Corp., Chicago, Ill.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.

VALVES, PUMP

Anchor Packing Co., Philadelphia, Pa.
Burrows Mfg. Co., F. A., York, Pa.
Dick Co., Inc., R. & J., Passaic, N. J.
Durabla Mfg. Co., New York, N. Y.
Garlock Packing Co., Palmyra, N. Y.
Goodrich Co., B. F., Akron, O.
Jacuzzi Bros., Inc., Richmond, Calif.
Quaker Rubber Corp., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J.
Red Jacket Mfg. Co., Davenport, Ia.
United States Rubber Company, New York, N. Y.
Williams Gauge Co., The, Pittsburgh, Pa.

VALVES, RADIATOR, AIR

● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Anderson Products, Inc., Cambridge, Mass.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
Beaton & Corbin Mfg. Co., Southington, Conn.
Bridgeport Brass Co., Bridgeport, Conn.
Chicago Specialty Mfg. Co., Chicago, Ill.
Curtis Automotive Devices, Inc., Dayton, O.
Detroit Brass & Malleable Works, Detroit, Mich.
● Detroit Lubricator Co., Detroit, Mich.
● Dole Valve Co., The, Chicago, Ill.
G & H Mfg. Co., Philadelphia, Pa.
● Gold Top Heating Inc., Butte, Mont.
Gorton Heating Co., Cranford, N. J.
Heat Timer Corp., New York, N. Y.
● Hoffman Specialty Co., Indianapolis, Ind.
Keeney Mfg. Co., Newington, Conn.
Little Mfg. Co., M. S., Hartford, Conn.
● Maid-O'-Mist, Inc., Chicago, Ill. (Humidifying)
Majot Automatic Machine Co., Inc., East Orange, N. J.
McAlear Mfg. Co., Chicago, Ill.
Moreheat Distribution, Inc., Cincinnati, O.
New York Air Valve Corp., New York, N. Y.
Positive Control Co., The, Cincinnati, O.
● Powers Regulator Co., Chicago, Ill.
Riggio Co., Frank D., Rutherford, N. J.
Schaible Co., The, Cincinnati, O.
Taco Heaters, Inc., Providence, R. I.
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.

VALVES, RADIATOR, AUTOMATIC TEMPERATURE CONTROL, ELECTRIC

Barber-Colman Co., Rockford, Ill.
● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
● General Controls Co., Glendale, Calif.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
● Sarcotherm Controls, Inc., New York, N. Y.
Vapor Heating Corp., Chicago, Ill.

VALVES, RADIATOR, AUTOMATIC TEMPERATURE CONTROL, PNEUMATIC

● Johnson Service Co., Milwaukee, Wis.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
● Powers Regulator Co., Chicago, Ill.

VALVES, RADIATOR, AUTOMATIC TEMPERATURE CONTROL, SELF-CONTAINED

Edison, Inc., Thos. A., Instrument Div., West Orange, N. J.
● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
● General Controls Co., Glendale, Calif.
Majot Automatic Machine Co., Inc., East Orange, N. J.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
● Powers Regulator Co., Chicago, Ill.
● Sterling, Inc., Milwaukee, Wis.
● Trane Co., The, LaCrosse, Wis.

VALVES, RADIATOR, ORIFICE

● American District Steam Co., North Tonawanda, N. Y.
● Barnes & Jones, Inc., Boston, Mass.
Cashin Co., W. D., Boston, Mass.
● Dunham Co., C. A., Chicago, Ill.
● Grinnell Co., Inc., Providence, R. I.
● Illinois Engineering Co., Chicago, Ill.
Marsh Valve Co., Dunkirk, N. Y.
New York Air Valve Corp., New York, N. Y.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
Simplex Heating Specialty Co., Inc., Lynchburg, Va.
● Trane Co., The, LaCrosse, Wis.
● Webster & Co., Warren, Camden, N. J.

VALVES, RADIATOR, STEAM AND HOT WATER, HAND

● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
● Barnes & Jones, Inc., Boston, Mass.
Belknap Mfg. Co., Bridgeport, Conn.
● Bishop & Babcock Mfg. Co., Cleveland, O.
Cashin Co., W. D., Boston, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
● Crane Co., Chicago, Ill.
● Detroit Lubricator Co., Detroit, Mich.
● Dunham Co., C. A., Chicago, Ill.
● Fairbanks Co., New York, N. Y.
● Haines & Co., William S., Philadelphia, Pa.
Hammond Brass Wks., Hammond, Ind.
● Hoffman Specialty Co., Indianapolis, Ind.
● Illinois Engineering Co., Chicago, Ill.
● Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
● Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
Marsh Valve Co., Dunkirk, N. Y.
Milwaukee Valve Co., Milwaukee, Wis.
Ohio Brass Co., Mansfield, O.
● Ohio Injector Co., Wadsworth, O.
Powell Co., Wm., Cincinnati, O.
● Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
Schaible Co., The, Cincinnati, O.
Scott Valve Mfg. Co., Detroit, Mich.
● Sterling, Inc., Milwaukee, Wis.
● Trane Co., The, La Crosse, Wis.
United States Radiator Corp., Detroit, Mich.
● Webster & Co., Warren, Camden, N. J.
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.

VALVES, RADIATOR, STEAM AND HOT WATER, MODULATING

● American District Steam Co., North Tonawanda, N. Y.
● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
● Barnes & Jones, Inc., Boston, Mass.
● Bishop & Babcock Mfg. Co., Cleveland, O.
Cashin Co., W. D., Boston, Mass.
Cryer Trap & Valve Co., Inc., New York, N. Y.
● Dunham Co., C. A., Chicago, Ill.
● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
● Haines & Co., William S., Philadelphia, Pa.
● Hoffman Specialty Co., Indianapolis, Ind.
● Illinois Engineering Co., Chicago, Ill.
● Jenkins Bros., New York, N. Y.
● Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
Marsh Valve Co., Dunkirk, N. Y.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Mouat Vapor Heating Co., The, Cleveland, O.
Ohio Brass Co., Mansfield, O.
● Sarco Co., Inc., New York, N. Y.
● Sarcotherm Controls, Inc., New York, N. Y.
Simplex Heating Specialty Co., Inc., Lynchburg, Va.
● Sterling, Inc., Milwaukee, Wis.
Tallmadge & Co., Webster, East Orange, N. J.
Vapor Specialty Co., New York, N. Y.
● Webster & Co., Warren, Camden, N. J.

VALVES, REFRIGERATION (ANGLE, CHECK, GATE, GLOBE, NEEDLE, RELIEF)

Baker Refrigeration Corp., South Windham, Me.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.

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Central Brass Mfg. Co., Cleveland, O.
● Crane Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Detroit Stamping Co., Detroit, Mich.
● Frick Co., Waynesboro, Pa.
Hammel-Dahl Co., Providence, R. I.
● Henry Valve Co., Melrose Park, Ill.
Hubbell Corp., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
● Jenkins Bros., New York, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Lonergan Co., J. E., Philadelphia, Pa.
● Lunkenheimer Co., Cincinnati, O.
Mueller Brass Co., Port Huron, Mich.
Parker Appliance Co., The, Cleveland, O.
Reynolds Mfg. Co., Inc., Springfield, Mo.
Shank Co., Cyrus, Chicago, Ill.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Weatherhead Co., Cleveland, O.
Worthington Pump & Machinery Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
● York Corp., York, Pa.

VALVES, REFRIGERATION, BACK PRESSURE

● Alco Valve Co., St. Louis, Mo.
Aminco Refrigeration Products Co., Detroit, Mich.
Automatic Products Co., Milwaukee, Wis.
Bailey Co., Chas. M., San Francisco, Calif.
Baker Refrigeration Corp., South Windham, Me.
● Cash Co., A. W., Decatur, Ill.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Electrimatic Co., Sales Affiliate, Jas. P. Marsh Corp., Skokie, Ill.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Frigidaire Div., General Motors Corp., Dayton, O.
● General Controls Co., Glendale, Calif.
Hammel-Dahl Co., Providence, R. I.
Hubbell Corp., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Lonergan Co., J. E., Philadelphia, Pa.
Mueller Brass Co., Port Huron, Mich.
Schnacke, Inc., Evansville, Ind.
Temprite Products Corp., Detroit, Mich.
X L Refrigerating Co., Chicago, Ill.
● York Corp., York, Pa.

VALVES, REFRIGERATION, EXPANSION, CONSTANT PRESSURE

● Alco Valve Co., St. Louis, Mo.
Aminco Refrigeration Products Co., Detroit, Mich.
Automatic Products Co., Milwaukee, Wis.
Baker Refrigeration Corp., South Windham, Me.
● Cash Co., A. W., Decatur, Ill.
● Crane Co., Chicago, Ill.
● Detroit Lubricator Co., Detroit, Mich.
Foster Engineering Co., Union, N. J.
Frigidaire Div., General Motors Corp., Dayton, O.
Hammel-Dahl Co., Providence, R. I.
Hubbell Corp., Chicago, Ill.
Lonergan Co., J. E., Philadelphia, Pa.
Mayson Mfg. Co., Inc., Detroit, Mich.
Peerless of America, Inc., Chicago, Ill.
Tenney Engineering, Inc., Newark, N. J.
X L Refrigerating Co., Chicago, Ill.
● York Corp., York, Pa.

VALVES, REFRIGERATION, EXPANSION, THERMOSTATIC

● Alco Valve Co., St. Louis, Mo.
Automatic Products Co., Milwaukee, Wis.
Cutler-Hammer Inc., Milwaukee, Wis.
● Detroit Lubricator Co., Detroit, Mich.
Frigidaire Div., General Motors Corp., Dayton, O.
● General Controls Co., Glendale, Calif.
Mayson Mfg. Co., Inc., Detroit, Mich.
Peerless of America, Inc., Chicago, Ill.
● Sporlan Valve Co., St. Louis, Mo.
Tenney Engineering, Inc., Newark, N. J.
X L Refrigerating Co., Chicago, Ill.

VALVES, REFRIGERATION, FLOAT, HIGH PRESSURE

● Alco Valve Co., St. Louis, Mo.
Aminco Refrigeration Products Co., Detroit, Mich.
Foster Engineering Co., Union, N. J.
● Frick Co., Waynesboro, Pa.
Hubbell Corp., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
● Mercoid Corp., Chicago, Ill.
Phillips & Co., H. A., Chicago, Ill.
Temprite Products Corp., Detroit, Mich.
Vilter Mfg. Co., Milwaukee, Wis.
Wabash Mfg. Co., Chicago, Ill.
Worthington Pump & Machinery Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
● York Corp., York, Pa.

VALVES, REFRIGERATION, FLOAT, HIGH PRESSURE AND LOW PRESSURE

Aminco Refrigeration Products Co., Detroit, Mich.
Mayson Mfg. Co., Inc., Detroit, Mich.
Temprite Products Corp., Detroit, Mich.
Vilter Mfg. Co., Milwaukee, Wis.
Voss Co., J. H. H., Inc., New York, N. Y.
● York Corp., York, Pa.

VALVES, REFRIGERATION, LIQUID CONTROL, FLOAT PILOTED

● Alco Valve Co., St. Louis, Mo.
Cooper Co., Clark, Palmyra, N. J.
Phillips & Co., H. A., Chicago, Ill.
● York Corp., York, Pa.

VALVES, REFRIGERATION, MAGNETIC STOP

● Alco Valve Co., St. Louis, Mo.
Automatic Products Co., Milwaukee, Wis.
Automatic Switch Co., Orange, N. J.
● Detroit Lubricator Co., Detroit, Mich.
● Frick Co., Waynesboro, Pa.
● General Controls Co., Glendale, Calif.
● Henry Valve Co., Melrose Park, Ill.
Hubbell Corp., Chicago, Ill.
● Mercoid Corp., Chicago, Ill.
Penn Electric Switch Co., Goshen, Ind.
Skinner Electric Valve Div., Norwalk, Conn.
● Sporlan Valve Co., St. Louis, Mo.

VALVES, REFRIGERATION, TEMPERATURE REGULATING OR SNAP ACTION SUCTION

● Alco Valve Co., St. Louis, Mo.
Frigidaire Div., General Motors Corp., Dayton, O.

VALVES, REFRIGERATION, WATER REGULATING, PRESSURE OR TEMPERATURE ACTUATED

Aminco Refrigeration Products Co., Detroit, Mich.
Art Valve Co., Chicago, Ill.
Automatic Products Co., Milwaukee, Wis.
Bailey Co., Chas. M., San Francisco, Calif.
● Cash Co., A. W., Decatur, Ill.
Cooper Co., Clark, Palmyra, N. J.
Electrimatic Co., Sales Affiliate, Jas. P. Marsh Corp., Skokie, Ill.
Farris Engineering Corp., Palisades Park, N. J.
● Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Frigidaire Div., General Motors Corp., Dayton, O.
Hubbell Corp., Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Mfg. Co., Hamilton, O.
Mayson Mfg. Co., Detroit, Mich.
● Mercoid Corp., Chicago, Ill.
Penn Electric Switch Co., Goshen, Ind.
Perfection Refrigeration Parts Co., Harvey, Ill.
● Sarco Co., Inc., New York, N. Y.
Shank Co., Cyrus, Chicago, Ill.
● Spence Engineering Co., Inc., Walden, N. Y.
Tagliabue Corp., C. J., Newark, N. J.
● York Corp., York, Pa.

VALVES, RELIEF, HOT WATER, COMBINED PRESSURE AND TEMPERATURE OPERATED

Beaton & Cadwell Mfg. Co., New Britain, Conn.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Cooper Co., Clark, Palmyra, N. J.
● Fisher Governor Co., Marshalltown, Ia.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Kainer & Co., Chicago, Ill.
Mueller Co., Decatur, Ill.
Patrol Valve Co., The, Cleveland, O.
Sall Bros. Co., Rockford, Ill.
Schaible Co., The, Cincinnati, O.
Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass.
● Thrush & Co., H. A., Peru, Ind.
● Trane Co., The, La Crosse, Wis.
Watts Regulator Co., Lawrence, Mass.
Welsbach Corp., The, Kitson Div., Philadelphia, Pa.

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VALVES, RELIEF, HOT WATER, PRESSURE OPERATED

Ashton Valve Co., Cambridge, Mass.
Bailey Co., Chas. M., San Francisco, Calif.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
● Bell & Gossett Co., Morton Grove, Ill.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Boylston Steam Specialty Co., Chicago, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Central Brass Mfg. Co., Cleveland, O.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Davis Regulator Co., Chicago, Ill.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Durabla Mfg. Co., New York, N. Y.
Eddy Valve Co., Waterford, N. Y.
Edward Valves, Inc., East Chicago, Ind.
Farris Engineering Corp., Palisades Park, N. J.
● Fisher Governor Co., Marshalltown, Ia.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Kainer & Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
Kunkle Valve Co., Ft. Wayne, Ind.
Lonergan Co., J. E., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
McAlear Mfg. Co., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Neptune Meter Co., New York, N. Y.
OPW Corp., Cincinnati, O.
Parker Appliance Co., The, Cleveland, O.
Patrol Valve Co., The, Cleveland, O.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Sall Bros. Co., Rockford, Ill.
● Sarcotherm Controls, Inc., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Schaible Co., The, Cincinnati, O.
Scott Valve Mfg. Co., Detroit, Mich.
Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass.
Staples & Pfeiffer, San Francisco, Calif.
● Swartwout Co., Cleveland, O.
Taco Heaters, Inc., Providence, R. I.
Tagliabue Corp., C. J., Newark, N. J.
● Thrush & Co., H. A., Peru, Ind.
● Trane Co., The, LaCrosse, Wis.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Tryco Products, Inc., Westfield, Mass.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
Welsbach Corp., The, Kitson Div., Philadelphia, Pa.

VALVES, RELIEF, HOT WATER, PRESSURE OPERATED, SELF-FILLING

Bailey Co., Chas. M., San Francisco, Calif.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
● Bell & Gossett Co., Morton Grove, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
● Crane Co., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
Mueller Co., Decatur, Ill.
Sall Bros. Co., Rockford, Ill.
● Sarcotherm Controls, Inc., New York, N. Y.
● Thrush & Co., H. A., Peru, Ind.
Watts Regulator Co., Lawrence, Mass.

VALVES, RELIEF, OIL

Andale Co., Philadelphia, Pa.
Ashton Valve Co., Cambridge, Mass.
Atlas Valve Co., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
● Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Davis Regulator Corp., Chicago, Ill.
Durabla Mfg. Co., New York, N. Y.
Edward Valves, Inc., East Chicago, Ind.
Farris Engineering Corp., Palisades Park, N. J.
● Fisher Governor Co., Marshalltown, Ia.
Fulflo Specialties Co., Inc., The, Blanchester, O.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Greer Hydraulics, Inc., Brooklyn, N. Y.
Grove Regulator Co., Oakland, Calif.
Hammel-Dahl Co., Providence, R. I.
Hubbell Corp., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Klipfel Valves, Inc., Div. of Hamilton-Thomas Corp., Hamilton, O.
Kunkle Valve Co., Ft. Wayne, Ind.
Lancaster Heat Transfer Co., Inc., Brooklyn, N. Y.
Locke Regulator Co., Salem, Mass.
Lonergan Co., J. E., Philadelphia, Pa.
● Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Milwaukee Valve Co., Milwaukee, Wis.
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Morrison Brothers Co., Dubuque, Ia.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Parker Appliance Co., The, Cleveland, O.
Preferred Utilities Mfg. Corp., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
Skinner Electric Valve Div., Norwalk, Conn.
Staples & Pfeiffer, San Francisco, Calif.
Thermix Corp., The, Greenwich, Conn.
Watson & McDaniel Co., Philadelphia, Pa.
Whittaker Co., Wm. R., Los Angeles, Calif.

VALVES, SADDLE

Beckett & Co., Inc., Thomas, Dallas, Tex.
Darling Valve & Mfg. Co., Williamsport, Pa.
● Fairbanks Co., New York, N. Y.
Imperial Brass Mfg. Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
● Maid-O'-Mist, Inc., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
● Ohio Injector Co., Wadsworth, O.
● Walworth Co., New York, N. Y.

VALVES, SAFETY, STEAM

Ashton Valve Co., Cambridge, Mass.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Farris Engineering Corp., Palisades Park, N. J.
Foster Engineering Co., Union, N. J.
Keckley Co., O. C., Chicago, Ill.
Kunkle Valve Co., Ft. Wayne, Ind.
Lonergan Co., J. E., Philadelphia, Pa.
● Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Marine & Industrial Products Co., Philadelphia, Pa.
North American Mfg. Co., Cleveland, O.
Powell Co., Wm., Cincinnati, O.
Scott Valve Mfg. Co., Detroit, Mich.

VALVES, SLIDE

Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
General Ceramics & Steatite Corp., Keasbey, N. J. (chemical stoneware)
R-S Products Corp., Philadelphia, Pa.
Rockwell Co., W. S., Fairfield, Conn.
Saval Inc., Los Angeles, Calif.
Whittaker Co., Wm. R., Los Angeles, Calif.

VALVES, SOLDER JOINT

American Brass Co., Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Cleveland Brass Mfg. Co., The, Cleveland, O.
● Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
● Fairbanks Co., New York, N. Y. (Silver braze joints)
Hammond Brass Works, Hammond, Ind.
● Henry Valve Co., Melrose Park, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
● Jenkins Bros., New York, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
Ohio Brass Co., Mansfield, O.
Pittsburgh Valve & Fittings Co., Barberton, O.
Powell Co., Wm., Cincinnati, O.
Scott Valve Mfg. Co., Detroit, Mich.
● Walworth Co., New York, N. Y. (Brazed)
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.

VALVES, SOLENOID

● Alco Valve Co., St. Louis, Mo.
Automatic Products Co., Milwaukee, Wis.
Automatic Switch Co., Orange, N. J.
Barber-Colman Co., Rockford, Ill.
Bellows Co., Akron, O.
Caton Co., Newark, N. J.
Cooper Co., Clark, Palmyra, N. J.
Cutler-Hammer, Inc., Milwaukee, Wis.
Davis Regulator Co., Chicago, Ill.
● Detroit Lubricator Co., Detroit, Mich.
Electrimatic Co., Sales Affiliate, Jas. P. Marsh Corp., Skokie, Ill.
Erickson Specialty Co., Cohoes, N. Y.
● Frick Co., Waynesboro, Pa.
● General Controls Co., Glendale, Calif.
General Electric Co., Apparatus Dept., Schenectady, N. Y.

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- Gleason-Avery, Inc., Auburn, N. Y.
- Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
- Grove Regulator Co., Oakland, Calif.
- Hays Mfg. Co., Erie, Pa.
- ● Henry Valve Co., Melrose Park, Ill.
- Hook & Ackerman, Inc., New York, N. Y.
- Hubbell Corp., Chicago, Ill.
- Hunt & Son, Inc., C. B., Salem, O.
- Johnson Corp., The, Three Rivers, Mich.
- Keckley Co., O. C., Chicago, Ill.
- Lammert & Mann Co., Chicago, Ill. (Gas safety shut-off)
- Locke Regulator Co., Salem, Mass.
- Lonergan Co., J. E., Philadelphia, Pa.
- ● McDonnell & Miller, Inc., Chicago, Ill.
- McQuay-Norris Mfg. Co., St. Louis, Mo.
- ● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- ● Nicholson & Co., W. H., Wilkes-Barre, Pa.
- Northern Equipment Co., Erie, Pa.
- Paul Valve Corp., New York, N. Y.
- Penn Electric Switch Co., Goshen, Ind.
- Pfening Co., Fred D., Columbus, O. (water and steam)
- R-S Products Corp., Philadelphia, Pa.
- Ruggles-Klingemann Mfg. Co., Salem, Mass.
- ● Sarco Co., Inc., New York, N. Y.
- ● Sarcotherm Controls, Inc., New York, N. Y.
- Saval, Inc., Los Angeles, Calif.
- Skinner Electric Valve Div., Norwalk, Conn.
- ● Sporlan Valve Co., St. Louis, Mo.
- Square D Co., Industrial Controller Div., Milwaukee, Wis.
- Supreme Electric Products Corp., Rochester, N. Y.
- Taylor-Winfield Corp., Warren, O.
- Vapor Heating Corp., Chicago, Ill.
- ● White-Rodgers Electric Co., St. Louis, Mo.

VALVES, 2, 3 AND 4 WAY

- ● Alco Valve Co., St. Louis, Mo.
- Automatic Temperature Control Co., Inc., Philadelphia, Pa.
- Barber-Colman Co., Rockford, Ill.
- Belfield Valve Div. of Minneapolis-Honeywell, Philadelphia, Pa.
- Bellows Co., Akron, O.
- Black-Sivalls & Bryson, Inc., Kansas City, Mo.
- Bordo Co., Inc., L. J., Glenside, Pa.
- Bristol Co., The, Waterbury, Conn.
- ● Cash Co., A. W., Decatur, Ill.
- Cash Valve Mfg. Co., A. W., Decatur, Ill.
- Caton Co., Newark, N. J.
- Clark Controller Co., Cleveland, O.
- Cooper Co., Clark, Palmyra, N. J.
- ● Crane Co., Chicago, Ill.
- Davis Regulator Co., Chicago, Ill.
- Detroit Brass & Malleable Works, Detroit, Mich.
- ● Detroit Lubricator Co., Detroit, Mich.
- De Zurik Shower Co., Sartell, Minn.
- ● Fisher Governor Co., Marshalltown, Ia.
- ● General Controls Co., Glendale, Calif.
- Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
- Grove Regulator Co., Oakland, Calif.
- Hammel Dahl Co., Providence, R. I.
- ● Henry Valve Co., Melrose Park, Ill.
- Homestead Valve Mfg. Co., Coraopolis, Pa.
- Hunt & Son, Inc., C. B., Salem, O.
- Hydro-Aire, Inc., Burbank, Calif.
- Imperial Brass Mfg. Co., Chicago, Ill.
- ● Johnson Service Co., Milwaukee, Wis.
- Keller Tool Co., Grand Haven, Mich.
- Kerotest Mfg. Co., Pittsburgh, Pa.
- Lawler Automatic Controls, Inc., Mount Vernon, N. Y.
- Lonergan Co., J. E., Philadelphia, Pa.
- ● Lunkenheimer Co., Cincinnati, O.
- Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
- ● Mercoid Corp., Chicago, Ill.
- ● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
- ● Nicholson & Co., W. H., Wilkes-Barre, Pa.
- Nordstrom Valve Div., Rockwell Mfg. Co., Pittsburgh, Pa.
- Parker Appliance Co., The, Cleveland, O.
- Penn Electric Switch Co., Goshen, Ind.
- Powell Co., Wm., Cincinnati, O.
- ● Powers Regulator Co., Chicago, Ill.
- R-S Products Corp., Philadelphia, Pa.
- ● Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
- Rockwell Co., W. S., Fairfield, Conn.
- Ruggles-Klingemann Mfg. Co., Salem, Mass.
- ● Sarcotherm Controls, Inc., New York, N. Y.
- Saval, Inc., Los Angeles, Calif.
- Schutte & Koerting Co., Philadelphia, Pa.
- Skinner Electric Valve Div., Norwalk, Conn.
- ● Spence Engineering Co., Inc., Walden, N. Y.
- ● Taylor Instrument Companies, Rochester, N. Y.
- Taylor-Winfield Corp., Warren, O.
- ● Walworth Co., New York, N. Y. (Lubricated plug valves)
- ● Watson-Stillman Co., Roselle, N. J. (Hydraulic service)
- Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.
- Whittaker Co., Wm. R., Los Angeles, Calif.

VANES, DUCT TURNING, PREFABRICATED

- ● Anemostat Corp. of America, New York, N. Y. (Equalizing deflectors)
- Barber-Colman Co., Rockford, Ill.
- Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
- Goettl Bros. Metal Prod. Inc., Phoenix, Ariz.
- ● Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
- ● Titus Mfg. Corp., Waterloo, Ia.
- ● Tuttle & Bailey, Inc., New Britain, Conn.

VAPOR HEATING SYSTEMS

See Systems, Heating, Vapor

VARIABLE SPEED DRIVES

See Changers, Speed, Hydraulic Coupling; Changers, Speed, Mechanical; Reducers, Speed; Pulleys and Sheaves, for Belt Drives

VARIABLE SPEED PULLEYS

See Changers, Speed, Mechanical

V-BELT DRIVES

See Drives, V-Belt

VELOCITY REGULATORS

See Regulators, Air Velocity

VENT FLUE CAPS

See Caps, Vent Flue

VENTILATING HOSE

See Ducts and Duct Fittings, Prefabricated, Non-Metallic

VENTILATION HEATERS

See Surface, Finned, Heating; Ventilators, Roof, Fan; Ventilators, Unit

VENTILATORS, MUSHROOM

- Chicago Blower Corp., Chicago, Ill.
- ● De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
- Dickinson, Aeolus, Chicago, Ill.
- Kauffman Air Conditioning Corp., St. Louis, Mo.
- Knight, Maurice A., Akron, O. (Stoneware)
- Knowles Mushroom Ventilator Co., Upper Montclair, N. J.
- Lumm Co., A. H., Toledo, O.
- ● Mueller Furnace Co., L. J., Milwaukee, Wis.
- Penn Ventilating Co., Philadelphia, Pa.
- Van Noorden Co., E., Boston, Mass.
- Ventilating Products Co., Chicago, Ill.

VENTILATORS, ROOF, FAN

- Aerovent Fan Co., Inc., Piqua, O.
- Air Controls, Inc., Div. of Cleveland Heater Co., Cleveland, O.
- ● Air Devices, Inc., New York, N. Y.
- Airecon Industries, Detroit, Mich.
- Allen Ventilator Div., Production Planning Co., Rochester, Minn.
- American Coolair Corp., Jacksonville, Fla.
- American-Larson Ventilation Co., Pittsburgh, Pa.
- American Steel Band Co., Pittsburgh, Pa.
- Ammerman Co., C. L., Minneapolis, Minn.
- Arex Co., Chicago, Ill.
- Bar-Brook Mfg. Co., Inc., Shreveport, La.
- ● Bishop & Babcock Mfg. Co., Cleveland, O.
- ● Breidert Co., G. C., Los Angeles, Calif.
- Burt Mfg. Co., Akron, O.
- Century Fan & Ventilator Co., Stamford, Conn.
- Chelsea Fan & Blower Co., Inc., Irvington, N. J.
- Chicago Blower Corp., Chicago, Ill.
- Clay Equipment Corp., Cedar Falls, Ia.
- Dana Fan & Blower Corp., Cincinnati, O.
- Davidson Hy Duty Roof Fan Co., Newton, Mass.
- ● De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
- Dickinson, Aeolus, Chicago, Ill.
- Diehl Mfg. Co., Somerville, N. J.
- Electrovent Fan & Mfg. Co., Chicago, Ill.
- Empire Ventilation Equipment Co., Long Island City, N. Y.
- Fingles Co., The, Baltimore, Md.
- ● Gallaher Co., The, Owatonna, Minn., & Omaha, Neb.
- Gehri Co., Tacoma, Wash.
- Hartzell Propeller Fan Co., Piqua, O.
- Hirschman-Pohle Co., Inc., LeRoy, N. Y.
- Howes-Woods Co., Cambridge, Mass.
- Ilg Electric Ventilating Co., Chicago, Ill.
- International Engineering, Inc., Dayton, O.
- Iona Ventilator Co., Inc., Philadelphia, Pa.
- Iron Lung Ventilator Co., Cleveland, O.
- Jenn Air Products Co., Indianapolis, Ind.
- Jordan & Co., Inc., Paul R., Indianapolis, Ind.
- Kernchen Co., Chicago, Ill.

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● King Co., The, Owatonna, Minn.
Lee & Son Co., Thomas, Cincinnati, O.
Lumm Co., A. H., Toledo, O.
Martin Fan & Blower Co., Chicago, Ill.
Mellish & Murray Co., Chicago, Ill.
Mountain States Equipment Co., Denver, Colo.
Muckle Mfg. Co., Owatonna, Minn.
Myers Electric Co., Inc., Pittsburgh, Pa.
● New York Blower Co., Chicago, Ill.
Newcomb-Detroit Co., Detroit, Mich.
Paasche Airbrush Co., Chicago, Ill.
Peerless Electric Co., Warren, O.
Penn Ventilating Co., Philadelphia, Pa.
Phoenix Ventilator Co., Inc., Brooklyn, N. Y.
● Propellair Div., Robbins & Myers Inc., Springfield, O.
Robertson Co., H. H., Pittsburgh, Pa.
Royal Ventilator Co., Philadelphia, Pa.
Schwitzer-Cummins Co., Indianapolis, Ind.
Somers, Inc., H. J., Detroit, Mich.
● South Bend Air Products, Inc., South Bend, Ind.
● Swartwout Co., Cleveland, O.
Trade-Wind Motorfans, Inc., Los Angeles, Calif.
● Trane Co., The, LaCrosse, Wis.
Truflo Fan Co., Harmony, Pa.
Uno Ventilator Co., Cliftondale, Mass.
Utility Appliance Corp., Los Angeles, Calif.
Van Noorden Co., E., Boston, Mass.
Washburne & Co., E. G., New York, N. Y.
Waverly Heating Supply Co., Boston, Mass.
Western Engineering & Mfg. Co., Los Angeles, Calif.
● Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Wind-Way Fan & Ventilator Co., New Orleans, La.
● Wing Mfg. Co., L. J., New York, N. Y.
Winkler & Sons, Inc., A. E., Milwaukee, Wis.

VENTILATORS, ROOF, GRAVITY

Accurate Sheet Metal Mfg. Works, Chicago, Ill.
Air Control Products, Inc., Coopersville, Mich.
● Air Devices, Inc., New York, N. Y.
Airecon Industries, Detroit, Mich.
Airjet Ventilator Co., Pasadena, Calif.
Ajax Furnace Fitting Co., Div. of Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Allen Ventilator Div., Production Planning Co., Rochester, Mich.
American-Larson Ventilation Co., Pittsburgh, Pa.
American Sheet Metal Works, New Orleans, La.
American Steel Band Co., Pittsburgh, Pa.
Arex Co., Chicago, Ill.
Autoforce Ventilating System, Boston, Mass.
● Breidert Co., G. C., Los Angeles, Calif.
Burt Mfg. Co., Akron, O.
Century Fan & Ventilator Co., Stamford, Conn.
Clay Equipment Corp., Cedar Falls, Ia.
Danzer Metal Works Co., Hagerstown, Md.
Day Co., The, Minneapolis, Minn.
Dickinson, Aeolus, Chicago, Ill.
Empire Ventilation Equipment Co., Long Island City, N. Y.
Fingles Co., The, Baltimore, Md.
Gehri Co., Tacoma, Wash.
Goettl Bros. Metal Prod. Inc., Phoenix, Ariz.
Hirschman-Pohle Co., Inc., LeRoy, N. Y.
Howes-Woods Co., Cambridge, Mass.
Inland Steel Products Co., Milwaukee, Wis.
Iona Ventilator Co., Inc., Philadelphia, Pa.
Iwan Brothers, South Bend, Ind.
Jordan & Co., Inc., Paul R., Indianapolis, Ind.
Kernchen Co., Chicago, Ill.
● King Co., The, Owatonna, Minn.
Klauer Mfg. Co., Dubuque, Ia.
Kleenaire Corp., Stevens Point, Wis.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
Lee & Son Co., Thomas, Cincinnati, O.
Leslie Welding Co., Chicago, Ill.
Levow, David, New York, N. Y.
Lumm Co., A. H., Toledo, O.
Lyon, Conklin & Co., Inc., Baltimore, Md.
Mellish & Murray Co., Chicago, Ill.
Moeschl-Edwards Corrugating Co., Inc., The, Cincinnati, O.
● National Metal Fabricators, Chicago, Ill.
Newcomb-Detroit Co., Detroit, Mich.
Patten Co., J. V., Sycamore, Ill.
Penn Ventilating Co., Philadelphia, Pa.
Phoenix Ventilator Co., Inc., Brooklyn, N. Y.
Pioneer Roofing & Sheet Metal Co., Muskogee, Okla.
Plasteel Products Co., Washington, Pa.
Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
Riggin Metal Products, Inc., Kankakee, Ill.
Robertson Co., H. H., Pittsburgh, Pa.
Royal Ventilator Co., Philadelphia, Pa.
St. Paul Corrugating Co., St. Paul, Minn.
Sioux Steel Co., Sioux Falls, S. D.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Souther Iron Co., E. E., St. Louis, Mo.
Southern States Iron Roofing Co., Savannah, Ga.
Standard Furnace & Supply Co., Omaha, Neb.
Standard Ventilator Co., Lewisburg, Pa.
● Swartwout Co., Cleveland, O.
Tierney Rotor Ventilator Co., Minneapolis, Minn.
Tiffin Eaves Trough Co., Tiffin, O.
Uno Ventilator Co., Cliftondale, Mass.
Van Noorden Co., E., Boston, Mass.
Walker Jamar Co., Duluth, Minn.
Warner Ventilator Co., La Grange, Ind.
Western Engineering & Mfg. Co., Los Angeles, Calif.
Willis Steel Corp., Galesburg, Ill.
Winkler & Sons, Inc., A. E., Milwaukee, Wis.
York Corrugating Co., York, Pa.

VENTILATORS, UNIT

● American Blower Corp., Detroit, Mich.
Bayley Blower Co., Milwaukee, Wis.
Circulators & Devices Mfg. Corp., New York, N. Y.
Gannon Co., Russell R., Cincinnati, O.
● Nelson Corp., Herman, Moline, Ill.
● Nesbitt, Inc., John J., Philadelphia, Pa.
Peerless Unit Ventilation Co., Inc., Bridgeport, Conn.
● Trane Co., The, LaCrosse, Wis.
● United States Air Conditioning Corp., Minneapolis, Minn.
● Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.

VIBRATION ABSORBERS

See Absorbers, Vibration

VIBRATION ELIMINATORS

See Absorbers, Vibration; Bases and Pads, Vibration Isolating; Hose, Metal and Fittings

VIBRATION ISOLATORS

See Absorbers, Vibration; Bases and Pads, Vibration Isolating; Hose, Metal and Fittings

VISCOSIMETERS

American Instrument Co., Silver Spring, Md.
Brabender Corp., Rochelle Park, N. J.
Brookfield Engineering Laboratories, Inc., Stoughton, Mass.
Daigger & Co., A., Chicago, Ill.
Fischer & Porter Co., Hatboro, Pa.
Fish-Schurman Corp., New York, N. Y.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Giannini & Co., Inc., G. M., Pasadena, Calif.
Greiner Co., Emil, New York, N. Y.
Humboldt Mfg. Co., Chicago, Ill.
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Precision Scientific Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Corp., C. J., Newark, N. J.
Thomas Co., Arthur H., Philadelphia, Pa.
Will Corp., Rochester, N. Y.

VISCOUS LIQUID PUMPS

See Pumps, Viscous Liquids

VISES, PIPE

American Pipe Tool Co., Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Armstrong Mfg. Co., Bridgeport, Conn.
Beaver Pipe Tools, Inc., Warren, O. (Sawing—for tubing)
Billings & Spencer Co., Hartford, Conn.
Crown Die & Tool Co., Chicago, Ill.
Desmond-Stephens Mfg. Co., Urbana, O.
Erie Tool Wks., Erie, Pa.
Hollands Mfg. Co., Erie, Pa.
International Nutyp Tool Co., Oswego, N. Y.
Munton Mfg. Co., Franklin Park, Ill.
Nye Tool Co., Chicago, Ill.
● Ridge Tool Co., Elyria, O.
Sac Tool Mfg. Co., St. Louis, Mo.
Toledo Pipe Threading Machine Co., Toledo, O.
Trimont Mfg. Co., Div. of Aetna Industrial Corp., Boston, Mass.
V-Mac Industries, Guilford, Conn.
Vanderman Mfg. Co., Willimantic, Conn.
Williams & Co., J. H., Buffalo, N. Y.
Yost Mfg. Co., Meadville, Pa.

VISE STANDS

See Stands, Pipe Vise

WALL THERMOSTATS

See Thermostats, Room or Wall

WARM AIR FURNACES

See Furnaces, Warm Air

WASHERS, AIR

● Air & Refrigeration Corp., New York, N. Y.
Airwasher Corp., Lansing, Mich.
● Alton Mfg. Co., Dallas, Tex.
● American Blower Corp., Detroit, Mich.

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Bahnson Co., Winston-Salem, N. C.
Bayley Blower Co., Milwaukee, Wis.
● Bishop & Babcock Mfg. Co., Cleveland, O.
Blower Application Co., Milwaukee, Wis.
● Buffalo Forge Co., Buffalo, N. Y.
● Carrier Corp., Syracuse, N. Y.
Centri-Spray Corp., Detroit, Mich. (Wet type)
● Clarage Fan Co., Kalamazoo, Mich.
Columbus Heating & Ventilating Co., Columbus, O.
● Comfort Products Corp., Dallas, Tex.
● Continental Air Filters, Inc., Louisville, Ky.
Drying Systems, Inc., Chicago, Ill.
Economy Equipment Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Lehigh Fan & Blower Co., Allentown, Pa.
● Marlo Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
Mellish & Murray Co., Chicago, Ill.
Mountain States Equipment Co., Denver, Colo.
● Murray Mfg. Co., D. J., Wausau, Wis.
Parks-Cramer Co., Fitchburg, Mass.
Peters-Dalton, Inc., Detroit, Mich.
Phillips Cooling Tower Co., Inc., New York, N. Y.
Schmieg Industries, Detroit, Mich.
Spray Engineering Co., Somerville, Mass.
Strandwitz & Co., Inc., W. J., Camden, N. J.
Tenney Engineering, Inc., Newark, N. J.
● Trane Co., The, LaCrosse, Wis.
● Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
● United States Air Conditioning Corp., Minneapolis, Minn.
Utility Appliance Corp., Los Angeles, Calif.
Vilter Mfg. Co., Milwaukee, Wis.
Western Blower Co., Seattle, Wash.
● Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
● York Corp., York, Pa.

WATER CHILLERS

See Chillers, Water, for Air Conditioning and Refrigeration

WATER DISTRIBUTORS FOR CONDENSERS

See Distributors, Water, for Condensers

WATER FILTERS

See Filters, Water

WATER HEATERS

See Heaters, Indirect, Submerged; Heaters, Water

WATER METERS

See Meters, Water

WATER SOFTENERS

See Softeners, Water

WATER TREATMENT

See Treatment, Water, to Inhibit Corrosion; Devices, Electrolytic for Preventing Corrosion.

WATER VAPOR REFRIGERATION

See Compressors, Refrigerating, Centrifugal; and Compressors, Refrigerating, Steam Jet

WELD TESTING MACHINES

See Machines, Testing, Weld

WELDERS, ARC

Air Reduction Sales Co., New York, N. Y.
Allied Weld-Craft, Inc., Indianapolis, Ind.
Borm Mfg. Co., Elgin, Ill.
Eisler Engineering Co., Inc., Newark, N. J.
Electric Arc, Inc., Newark, N. J.
Ergolyte Mfg. Co., Philadelphia, Pa.
Eutectic Welding Alloys Corp., New York, N. Y.
Fern, Ralph, Scranton, Pa.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Glenn-Roberts Co., Inc., Indianapolis, Ind.
Greyhound A. C. Arc Welder Corp., Brooklyn, N. Y.
Hammett Electric Mfg. Co., Kansas City, Mo.
Hampton Electric Mfg. Co., Pittsburgh, Pa.
Harnischfeger Corp., Milwaukee, Wis.
Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
Hobart Bros. Co., Troy, O.
Ideal Electric & Mfg. Co., Mansfield, O.
Kern Co., John A., Chicago, Ill.
Lee Co., K. O., Aberdeen, S. D.
● Lincoln Electric Co., Cleveland, O.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y. (Inert gas-shielded)
Marquette Mfg. Co., Minneapolis, Minn.
Metal & Thermit Corp., New York, N. Y.
Mid-States Equipment Co., Chicago, Ill.
● Mid-States Welder Mfg. Co., Chicago, Ill.
Miller Electric Mfg. Co., Inc., Appleton, Wis.
National Cylinder Gas Co., Chicago, Ill.
Niagara Machine & Tool Wks., Buffalo, N. Y.
Sight Feed Generator Co., West Alexandria, O.
Smith Corp., A. O., Milwaukee, Wis.
Smith Welding Equipment Corp., Minneapolis, Minn.
Trindl Products, Ltd., Chicago, Ill.
Tweco Products Co., Wichita, Kan. (Cable connectors, electrode holders and accessories)
Una Welding, Inc., Cleveland, O. (Automatic shielded arc welding)
Welding Apparatus Co., Chicago, Ill.
● Westinghouse Electric Corp., Pittsburgh, Pa.
Will-Weld Mfg. Co., Inc., Omaha, Neb.
Wilson Welder & Metals Co., Inc., New York, N. Y.

WELDERS, SPOT

Acme Electric Welder Co., Los Angeles, Calif.
Acro Welder Mfg. Co., Milwaukee, Wis.
Agnew Electric Co., Milford, Mich.
Allied Weld-Craft, Inc, Indianapolis, Ind.
Alphil Spot Welding Co., Brooklyn, N. Y.
Doall Co., The, Des Plaines, Ill.
Eisler Engineering Co., Inc., Newark, N. J.
Electric Arc, Inc., Newark, N. J.
Federal Machine & Welder Co., The, Warren, O.
Fern, Ralph, Scranton, Pa.
Greyhound A. C. Arc Welder Corp., Brooklyn, N. Y.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y. (Inert gas-shielded arc)
Micro Products Co., Chicago, Ill.
● Mid-States Welder Mfg. Co., Chicago, Ill.
Miller Electric Mfg. Co., Inc., Appleton, Wis.
Peer, Inc., Benton Harbor, Mich.
Precision Welder & Machine Co., Cincinnati, O.
Rex Welder & Engineering Co., Kansas City, Mo.
Sciaky Bros., Inc., Chicago, Ill.
Taylor-Winfield Corp., Warren, O.
Thomson Electric Welder Co., Lynn, Mass.
Universal Power Corp., Cleveland, O.
Weldex, Inc., Detroit, Mich.

WELDERS, STUD

Federal Machine & Welder Co., The, Warren, O.
Nelson Stud Welding, Div. of Morton Gregory Corp., Lorain, O.
Powder Power Tool Corp., Portland, Ore.

WELDING COMPOUNDS

See Compounds, Welding

WELDING AND CUTTING APPARATUS, OXY-ACETYLENE

Air Reduction Sales Co., New York, N. Y.
Allied Weld-Craft, Inc., Indianapolis, Ind.
Arcos Corp., Philadelphia, Pa. (arc-oxygen)
Atlas Welding Accessories Co., Ferndale, Mich. (Weld cleaning tools)
Black Mfg. Co., The, Baltimore, Md.
Dockson Corp., Detroit, Mich.
Eutectic Welding Alloys Corp., New York, N. Y.
Galv-Weld Products, Dayton, O. (Regalvanizing process)
General Scientific Equipment Co., Philadelphia, Pa.
Goss Gas, Inc., Pittsburgh, Pa.
Harris Calorific Co., The, Cleveland, O.
Imperial Brass Mfg. Co., Chicago, Ill.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Liquid Carbonic Corp., The, Chicago, Ill.
Marquette Mfg. Co., Minneapolis. Minn.
Modern Engineering Co., St. Louis, Mo.
National Cylinder Gas Co., Chicago, Ill.
Powder Weld Process Co., The, Brooklyn, N. Y.
Smith Welding Equipment Corp., Minneapolis, Minn.
Tru-Line Corp., Santa Monica, Calif. (Protractor for marking pipe)
Victor Equipment Co., San Francisco, Calif.
Wall Chemicals Div. of The Liquid Carbonic Corp., Chicago, Ill.
Worthington Pump & Machinery Corp., Dunellen, N. J. (Welding positioner)

WELDING FUME COLLECTORS

See Exhausters, Welding Fume

WELDING PIPE CLAMPS

See Clamps, Pipe, Welding

WELDING RINGS

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WELDING ROD

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WHEELS, BLOWER

Advance Aluminum Castings Corp., Chicago, Ill.
Air Controls, Inc., Div. of Cleveland Heater Co., Cleveland, O.
Bayley Blower Co., Milwaukee, Wis.
● Bishop & Babcock Mfg. Co., Cleveland, O.
Bronson Mfg. Co., Los Angeles, Calif.
● Brundage Co., The, Kalamazoo, Mich.
Burden Div., Torrington Mfg. Co., Los Angeles, Calif.
Champion Blower & Forge Co., Lancaster, Pa.
● Clarage Fan Co., Kalamazoo, Mich.
Goettl Bros. Metal Prod. Inc., Phoenix, Ariz.
Hastings Air Conditioning Co., Hastings, Neb.
Jaden Mfg. Co., Hastings, Neb.
● Jan Air, Inc., Richmond, Ill.
Lau Blower Co., Dayton, O.
Martin Fan & Blower Co., Chicago, Ill.
Mayne Products Co., Dayton, O.
Morrison Products, Inc., Cleveland, O.
● New York Blower Co., Chicago, Ill.
Peerless Electric Co., Warren, O.
Revcor, not Inc., Chicago, Ill.
Schwitzer-Cummins Co., Indianapolis, Ind.
Torrington Mfg. Co., Torrington, Conn.
Triangle Mfg. Co., Oshkosh, Wis.
● United States Air Conditioning Corp., Minneapolis, Minn.
Utility Appliance Corp., Los Angeles, Calif.
Viking Air Conditioning Corp., Cleveland, O.
Western Blower Co., Seattle, Wash.
● Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.

WHITE PRINT MACHINES

See Machines, Blue Print and White Print

WINDOW VENTILATOR AND FILTER UNITS

See Units, Window Ventilator and Filter

WINDOWS, HEAT INSULATING

Andersen Corp., Bayport, Minn.
Chamberlin Co. of America, Detroit, Mich.
Ingersoll Steel Div., Borg-Warner Corp., Chicago, Ill.
Kane Mfg. Corp., Kane, Pa.
Libbey-Owens-Ford Glass Co., Toledo, O.
Mississippi Glass Co., New York, N. Y.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Russell Co., F. C., The, Cleveland, O.

WIRE, ELECTRIC, NUMBERED, FOR CONTROL SYSTEMS

Midwest Automatic Control Co., Des Moines, Ia.

WOOD PIPE

See Pipe, Wood

WRENCHES, PIPE

American Machine Wks., Inc., Racine, Wis.
Armstrong Bros. Tool Co., Chicago, Ill.
Bernz Co., Otto, Rochester, N. Y.
Billings & Spencer Co., Hartford, Conn.
● Bonney Forge & Tool Works, Allentown, Pa.
Erie Tool Works, Erie, Pa.
E-Zee Tool Mfg. Corp., New York, N. Y.
International Nutyp Tool Co., Oswego, N. Y.
Lowell Wrench Co., Worcester, Mass.
Nye Tool Co., Chicago, Ill.
Peck, Stow & Wilcox Co., Southington, Conn.
● Ridge Tool Co., Elyria, O.
Sac Tool Mfg. Co., St. Louis, Mo.
Snap-on Tools Corp., Kenosha, Wis.
Trimont Mfg. Co., Div. of Aetna Industrial Corp., Boston, Mass.
USHCO Mfg. Co., Inc., Buffalo, N. Y.
● Walworth Co., New York, N. Y.

WRENCHES, RATCHET

Armstrong Bros. Tool Co., Chicago, Ill.
Billings & Spencer Co., Hartford, Conn.
Blackhawk Mfg. Co., Milwaukee, Wis.
● Bonney Forge & Tool Works, Allentown, Pa.
Duro Metal Products Co., Chicago, Ill.
Greene, Tweed & Co., North Wales, Pa.
J O Mfg. Co., South Gate, Calif.
Lowell Wrench Co., Worcester, Mass.
Sac Tool Mfg. Co., St. Louis, Mo.
Snap-on Tools Corp., Kenosha, Wis.
Williams & Co., J. H., Buffalo, N. Y.

WRENCHES, TORQUE INDICATING

Ammco Tools, Inc., North Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Blackhawk Mfg. Co., Milwaukee, Wis.
● Bonney Forge & Tool Works, Allentown, Pa.
Duro Metal Products Co., Chicago, Ill.
J. O. Mfg. Co., South Gate, Calif.
Richmont, Inc., Los Angeles, Calif.
Sac Tool Mfg. Co., St. Louis, Mo.
Snap-on Tools Corp., Kenosha, Wis.
Sturtevant Co., P. A., Addison, Ill.
Williams & Co., J. H., Buffalo, N. Y.

WROUGHT IRON PIPE

See Pipe, Wrought Iron

WROUGHT IRON SHEETS

See Sheets, Wrought Iron

X-RAY MACHINES AND FILM

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ZINC SHEETS

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ZONE CONTROLS

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DIRECTORY SECTION

HEATING, PIPING, AND AIR CONDITIONING EQUIPMENT

FOR INDUSTRY AND LARGE BUILDINGS

PART 2—TRADE NAMES

A-B—Motor controllers. Allen-Bradley Co., Milwaukee, Wis.
ABC—Humidifiers, dust collectors, unit coolers. American Blower Corp., Detroit, Mich.
A-C—Water treatment. Elgin Softener Corp., Elgin, Ill.
ACB—Coatings. Tropical Paint & Oil Co., Cleveland, O.
A/C Range—Filters, American Air Filter Co., Inc., Louisville, Ky.
A-P—Damper operators, regulators, thermostats, valves. Automatic Products Co., Milwaukee, Wis.
A.P.S. Plasteel—Metal sheets. Plasteel Products Co., Washington, Pa.
A.R.A.—Non-metallic sheets and board. Grant Wilson, Inc., Chicago, Ill.
ARRC—Couplings, fittings, flanges, unions. Union Metal Wks., Chelsea, Mass.
ASBO—Ventilators. American Steel Band Co., Pittsburgh, Pa.
Abrasoweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Abso-Lute—Cement and compounds. Key Co., East St. Louis, Ill.
Accordion—Insulation. Infra Insulation, Inc., New York, N. Y.
Ace—Dampers. Martens & Stormoen, Boston, Mass.
Ace—Fittings, pipe, pumps, tanks, valves. American Hard Rubber Co., New York, N. Y.
Ace—Welders. Peer, Inc., Benton Harbor, Mich.
Ace-Parian—Fittings, Pipe. American Hard Rubber Co., New York, N. Y.
Ace-Saran—Pipe, tubing. American Hard Rubber Co., New York, N. Y.
Acitrol—Boiler cleaning compounds. Houghton & Co., E. F., Philadelphia, Pa.
Aco-Fin—Radiation. Airecon Industries, Detroit, Mich.
Acolite—Enamels and lacquers. Acorn Refining Co., Cleveland, O.
Acousteel—Insulation. Celotex Corp., The, Chicago, Ill.
Acousti-Celotex—Insulation. Celotex Corp., The, Chicago, Ill.
Acoustilite—Insulation. Insulite Co., Minneapolis, Minn.
Acratherm—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Actex—Heat exchangers. Wabash Mfg. Co., Chicago, Ill.
Adamant—Furnace cement. Botfield Refractories Co., Philadelphia, Pa.
Adastic—Insulating cement. Botfield Refractories Co., Philadelphia, Pa.
Adjust-O-Feeder—Feeders, pumps, water treatment. % Proportioneers, Inc. %, Providence, R. I.
Adjustor—Heating systems. The Kehm Corp., Chicago, Ill.
Adsco—Coils, conduit, regulators, coolers, exchangers, heaters, joints, meters, pipe, pipe hangers and supports, pipe protectors, separators, sight glasses, strainers, regulators, valves. American District Steam Co., North Tonawanda, N. Y.
Adsco Dual—Traps. American District Steam Co., North Tonawanda, N. Y.
Adsco Rotary—Condensation meters. American District Steam Co., North Tonawanda, N. Y.
Aemco—Relays, switches. Automatic Electric Mfg. Co., Mankato, Minn.
Aeracool—Blades, fans, louvers and shutters, ventilators. Myers Electric Co., Inc., Pittsburgh, Pa.
Aerisweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Aero—Roof ventilators. Jordan & Co., Paul R., Indianapolis, Ind.
Aero—Aftercoolers, heat exchangers. Niagara Blower Co., New York, N. Y.
Aero—Radiation. National Radiator Co., The, Johnstown, Pa.
Aerodyne—Fans. Jeffrey Mfg. Co., Columbus, O.
Aero-Flex—Registers. Auer Register Co., Cleveland, O.
Aerofuse—Air diffusers. Tuttle & Bailey, Inc., New Britain, Conn.
Aeropass—Condensers. Niagara Blower Co., New York, N. Y.
Aeropel—Ventilators. American Blower Corp., Detroit, Mich.
Aeroplane—Roof ventilators. Jordan & Co., Paul R., Indianapolis, Ind.
Aeroplex—Fans. Bayley Blower Co., Milwaukee, Wis.
Aeropull—Roof ventilators. Jordan & Co., Paul R., Indianapolis, Ind.
Aero Seal—Packing. Chicago Belting Co., Chicago, Ill.
Aerospot—Fans. South Bend Air Products, Inc., South Bend, Ind.
Aerotec—Cleaners, collectors, separators, switches, valves. Thermix Corp., The, Greenwich, Conn.
Aerovane—Grilles, registers. Tuttle & Bailey, Inc., New Britain, Conn.
Afco—Heaters. American Furnace Co., St. Louis, Mo.
Affco—Louvers and shutters. American Foundry & Furnace Co., Bloomington, Ill.
Agastat—Time switches, electrical relays. American Gas Accumulator Co., Elizabeth, N. J.
Agile—Welding electrodes. American Agile Corp., Cleveland, O.
Agitair—Air diffusers, filters, heaters, ventilators. Air Devices, Inc., New York, N. Y.
Airacoustic—Insulation. Johns-Manville, New York, N. Y.
Air-aid—Air freshening compound. Air Correctives Inc., New York, N. Y.
Airate—Ventilators. Dickinson, Aeolus, Chicago, Ill.
Air Cell—Asbestos insulation. Keasbey & Mattison Co., Ambler, Pa.
Airco—Arc welders, welding rod, solder, pipe cutting machines, torches. Air Reduction Sales Co., New York, N. Y.
Air Control—Fans, heaters, unit air conditioners. Hastings Air Conditioning Co., Hastings, Neb.
Air-Con—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Airefiner—Water treatment. Oakite Products, Inc., New York, N. Y.
Airex—Air washers, fans, unit air conditioners, ventilators. Mountain States Equipment Co., Denver, Colo.
Air-flo—Dampers, louvers and shutters. Air Conditioning Products Co., Detroit, Mich.
Air Flow—Fans. Goettl Bros. Metal Prod. Inc., Phoenix, Ariz.
Airfoil—Fans, fan blades, ventilators. Aerovent Fan Co., Inc., Piqua, O.
Airfoil—Dampers, diffusers, grilles, registers. Titus Mfg. Corp., Waterloo, Ia.
Airgraph—Thermometers. Hausman Mfg. & Sales Co., Chicago, Ill.
Airguide—Hygrometers, thermometers. Fee and Stemwedel, Inc., Chicago, Ill.
Air Guide—Vanes. Titus Mfg. Corp., Waterloo, Ia.
Air Guide—Radiation. Rempe Co., Chicago, Ill.
Airid—Valves. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Airidge—Ventilators. Dickinson, Aeolus, Chicago, Ill.
Airistocrat—Fan blades. Torrington Mfg. Co., Torrington, Conn.
Airjector—Ventilators. Swartwout Co., Cleveland, O.
Airmat Arrester—Dust collectors. American Air Filter Co., Inc., Louisville, Ky.
Air Meter—Air velocity meters. Hastings Instrument Co., Hampton, Va.
Airmover—Ventilators. Swartwout Co., Cleveland, O.
Airpak—Filters. Conoflow Corp., Philadelphia, Pa.
Airocool—Burners. National Airoil Burner Co., Inc., Philadelphia, Pa.
Airoil—Oil burners. National Airoil Burner Co., Inc., Philadelphia, Pa.
Air-O-Line—Indicator-controllers, recorder-controllers. Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Air-O-Line—Pumps, valves. Beckett & Co., Inc., Thomas, Dallas, Tex.
Air-O-Matic—Air conditioning units. Williams Oil-O-Matic Div., Eureka Williams Corp., Bloomington, Ill.
Airotherm—Zone control thermostat. Tallmadge & Co., Webster, East Orange, N. J.
Airotor—Blower wheels. Torrington Mfg. Co., Torrington, Conn.
Airout—Ventilators. Western Engineering & Mfg. Co., Los Angeles, Calif.
Airovent—Gas Burners. National Airoil Burner Co., Inc., Philadelphia, Pa.
Airsan—Filters. Air Filter Corp., Milwaukee, Wis.
Airstat — Regulators. Minneapolis - Honeywell Regulator Co., Minneapolis, Minn.
Airstream—Blower wheels, fans. Morrison Products, Inc., Cleveland, O.
Airswitch—Thermostats, regulators. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Airtron—Ducts and duct fittings, hose, insulation. Arrowhead Rubber Co., Los Angeles, Calif.
Air-Tumbler—Dust collectors. Dust Suppression & Engineering Co., Lake Orion, Mich.
Airturn—Duct turning vanes. Barber-Colman Co., Rockford, Ill.
Airvalve—Ventilators. Swartwout Co., Cleveland, O.
Air-Van—Ventilators. The Gallaher Co., Owatonna, Minn.
Air-Wave—Fans. Trade-Wind Motorfans, Inc., Los Angeles, Calif.
Airxpel—Traps. Wright-Austin Co., Detroit, Mich.
Airxpeler—Roof ventilators. Ammerman Co., G. L., Minneapolis, Minn.
Ajax—Gaskets, United States Gasket Co., Camden, N. J.
Akon—Water treatment. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Aktiv—Cleaning compounds. Turco Products, Inc., Los Angeles, Calif.
Akwatrol—Electrolytic devices, Scale removal service, Steam treatment. Apex Engineering Co., Chicago, Ill.
Alcalex—Water softeners. Research Products Corp., Madison, Wis.
Alco—Ventilators. Lumm Co., A. H., Toledo, O.
Alcoa—Angles, compounds, rods, dehydrators, electrodes, exchangers, pipe, sheets, tanks, tubing. Aluminum Co. of America, Pittsburgh, Pa.
Algaecide—Water treatment. Western Chemical Co., Kansas City, Mo.
All-Flex—Pipe joints, hose, packing. Gil-Lair Products, Inc., Pasadena, Calif.
All-In-One—Regulators. Bell & Gossett Co., Morton Grove, Ill.
Allspeed Selector—Mechanical changers. Worthington Pump & Machinery Corp., Harrison, N. J.
Alnor—Anemometers, indicator controllers, thermometers. Illinois Testing Laboratories, Inc., Chicago, Ill.
Alodine—Protective coatings. American Chemical Paint Co., Ambler, Pa.
Aloyco—Stainless steel fittings, nipples, pipe, tubing, unions, valves. Alloy Steel Products Co., Linden, N. J.
Alpine—Air conditioning units. International Metal Products Co., Phoenix, Ariz.
Alrosept—Slime and algae control treatment. Alrose Chemical Co., Providence, R. I.
Alternarc—Arc welders. Electric Arc, Inc., Newark, N. J.
Alumaweld—Solder and fluxes. Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
Aluminweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Alumiseal—Insulation. Hogan & Co., Inc., C. T., New York, N. Y.
A-Lum-O—Filters. Carey Electronic Engineering Co., Metal Wool Div., Springfield, O.
Always Reliable—Benders, cutters, torches, wrenches. Bernz Co., Otto, Rochester, N. Y.
Amblerex—Insulating cement. Keasbey & Mattison Co., Ambler, Pa.
Amco—Protective coatings. American Solder & Flux Co., Philadelphia, Pa.
Amco—Humidifiers. Grinnell Co., Inc., Providence, R. I.
Amco—Humidifiers, humidistats, hygrometers. American Moistening Co., Providence, R. I.
Amco Gaskets, packing. Austin-Mason Co., Everett, Mass.
Amcoil—Condensers, radiation, cooling and heating surfaces. American Coils Co., Newark, N. J.
American—Absorbers, metal hose. American Metal Hose Branch, American Brass Co., The, Waterbury, Conn.
American—Couplings. American Flexible Coupling Co., Erie, Pa.
American—Furnaces, heaters. American Foundry & Furnace Co., Bloomington, Ill.
American—Recorders, manometers, regulators, valves, thermometers. Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
American—Meters. American Meter Co., Inc., New York, N. Y.
American—Speed reducers. American Pulley Co., Philadelphia, Pa.
American—Pumps, softeners, water filters, water treatment. American Well Works, Aurora, Ill.
American—Pipe benders. American Pipe Bending Machine Co., Inc., Poultney, Vt.

American—Radiation. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
American Empire—Boilers. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
American Exbrook—Boilers. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
American Redflash—Boilers. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
American Standard—Boilers. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
American Water Tube—Boilers. American Radiator & Standard Sanitary Corp., Pittsburgh Pa.
Amerigear—Couplings. American Flexible Coupling Co., Erie, Pa.
Ameritherm—Heaters, air conditioning units. American Thermal Industries, Inc., Detroit, Mich.
Amesteam—Boilers. Ames Iron Works, Div. of Pierce Butler Radiator Corp., Oswego, N. Y.
Am-Pe-Co—Centrifugal fans. American Machine Products Co., Marshalltown, Ia.
Amtico—Heaters, air conditioning units. American Thermal Industries, Inc., Detroit, Mich.
Anaconda—Fittings, pipe, welding rod, sheets, solder, tubing, valves. American Brass Co., Waterbury, Conn.
Anemotherm—Direct reading meters. Anemostat Corp. of America, New York, N. Y.
Ankorite—Packing. Anchor Packing Co., Philadelphia, Pa.
Anthracite 1600—Water heaters. Catskill Metal Works, Inc., Catskill, N. Y.
Anti-Sweat—Insulation. Johns-Manville, New York, N. Y.
Apeco—Blueprint machines. American Photocopy Equipment Co., Chicago, Ill.
Apex—Analyzers, recorders, indicators. Uehling Instrument Co., Paterson, N. J.
Apex—Regulators, dampers. Ohio Products Co., Cleveland, O.
Apexior—Coatings. Dampney Co. of America, Boston, Mass.
Aqua-Clear—Water treatment. Sudbury Laboratory, South Sudbury, Mass.
AquaHeater—Heaters. Lewis & Co., Joseph E., Baltimore, Md.
Aqualator—Circulators. Triplex Heating Specialty Co., Inc., Peru, Ind.
Aquamizer—Condensers. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Aquastat—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Aqua-Tite—Seals. Schwitzer-Cummins Co., Indianapolis, Ind.
Aquatone—Treatment, steam and water. Ampion Corp., Long Island City, N. Y.
Aquatrol—Boiler cleaning compounds and water treatment. Aquatic Chemical Laboratories, Inc., New York, N. Y.
Aqulux—Heaters. Johnson Co., S. T., Philadelphia, Pa.
Arbest—Flanges, hangers, humidifiers, nipples, plates, valves. G & H Mfg. Co., Philadelphia, Pa.
Arc-Eng—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Arc-Heat—Burners. American Heat Corp., Boston, Mass.
Arco—Hangers, radiation, regulators, valves. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Arco Packless—Valves. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Arctic Circle—Air conditioning units. Goettl Bros. Metal Prod., Inc., Phoenix, Ariz.
Arctic Circle—Air conditioning units. International Metal Products Co., Phoenix, Ariz.
Arex-Austor—Roof ventilators. Arex Co., Chicago, Ill.
Arin—Louvers and shutters. Arex Co., Chicago, Ill.
Armorak—Insulation. Keasbey Co., Robert A., New York, N. Y.
Arrowtrol—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Art—Direct radiation. The National Radiator Co., Johnstown, Pa.
Artcraft—Air heaters. Chicago Steel Furnace Co., Chicago, Ill.
Asbestocel—Insulation. Johns-Manville, New York, N. Y.
Asco—Valves, relays, switches. Automatic Switch Co., Orange, N. J.
Ashcroft—Gages, recorders, testers. Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
At-a-Glance—Gages. Krueger Sentry Gauge Co., Green Bay, Wis.
Atlas—Fans, furnaces, heaters, International Sales Co., San Francisco, Calif.
Atmoset—Cement. Green Fire Brick Co., Mexico, Mo.
Atomick—Humidifiers, nozzles. Maid-O'-Mist, Inc., Chicago, Ill.
Atomist—Humidifiers. American Foundry & Furnace Co., Bloomington, Ill.
Autocrat—Oil burners. Chandler Co., Cedar Rapids, Ia.
Auto-Klean—Filters, strainers. Cuno Engineering Corp., Meriden, Conn.
Autolite—Gages, gage glasses, recorders, thermometers. Electric Autolite Co., Instrument & Gauge Div., Toledo, O.
Autolube—Bearings. International Powder Metallurgy, Inc., Ridgway, Pa.
Automatic Heat—Heaters. Heat Equipment not Inc., Chicago, Ill.
Auto-Rad—Radiation. Auto Radiator Specialty Co., Chicago, Ill.
Autovent—Eliminators, humidifiers, valves. Maid-O'-Mist, Inc., Chicago, Ill.
Autozone—Zone control unit. Tallmadge & Co., Webster, East Orange, N. J.
Axiom—Filters. Blocksom & Co., Michigan City, Ind.
Axivane—Fans. Joy Mfg. Co., Pittsburgh, Pa.

B.A.C.—Condensers. Baltimore Aircoil Co., Inc., Baltimore, Md.
B. B.—Blast gates. Berger Bros. Co., Philadelphia, Pa.
B & B—Heating and air conditioning equipment. Bishop & Babcock Mfg. Co., Cleveland, O.
B & C—Plates, malleable unions. Beaton & Corbin Mfg. Co., Southington, Conn.
BCA—Bearings. Bearings Co. of America, Lancaster, Pa.
B. & G.—Air eliminators, circulators, coolers, condensers, fittings, hangers, heat exchangers, heaters, heating systems, tanks, valves. Bell & Gossett Co., Morton Grove, Ill.
B-H—Insulation. Baldwin-Hill Co., Trenton, N. J.
B-H No. 1—Insulating cement. Baldwin-Hill Co., Trenton, N. J.
B-H No. 100—Pipe insulation. Baldwin-Hill Co., Trenton, N. J.
B & K—Pipe cutting and threading machines. Bignall & Keeler, Div., John Ramming Machine Co., St. Louis, Mo.
B-Line—Electric motors. Brown-Brockmeyer Co., Inc., Dayton, O.
BRI Gun—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.
B & W—Boilers, burners, desuperheaters, fuel economizers, refractories, stokers, superheaters. Babcock & Wilcox Co., New York, N. Y.
B & W—Pipes, tubes, and tubing. Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
B & W—Tubing. Babcock & Wilcox Tube Co., The, Welded Tube Div., Alliance, O.
Bacite—Insulation. Bird-Archer Co., Philadelphia, Pa.
Baco—Refractories. Bird-Archer Co., Philadelphia, Pa.
Badger—Time switches. Reliance Automatic Lighting Co., Racine, Wis.
Baflex—Enamels and lacquers, protective coatings. Interchemical Corp., Finishes Div., Newark, N. J.
Bakeraire—Unit aid conditioners. Baker Refrigeration Corp., South Windham, Me.
Balancer—Heating systems. Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Baldwin-Rex—Couplings, chain drives. Chain Belt Co., Milwaukee, Wis.
Ball Bushings—Ball bearings. Thomson Industries, Inc., Manhasset, N. Y.
Balsam-Wool—Insulation. Wood Conversion Co., St. Paul, Minn.
Bankheat—Oil burners. Johnson Co., S. T., Philadelphia, Pa.
Barcol—Humidistats, motors, operators, regulators, thermostats, valves. Barber-Colman Co., Rockford, Ill.
Barnes—Cutters. Erie Tool Works, Erie, Pa.
Barreled Sunlight—Enamels. U.S. Gutta Percha Paint Co., Providence, R. I.
Barry—Bearings, pulleys and sheaves. Dick Co., Inc., R. & J., Passaic, N. J.
Barton-American — Pumps. American-Marsh Pumps, Inc., Battle Creek, Mich.
Base Ray—Baseboard radiation. Burnham Corp., Boiler Div., Irvington, N. Y.
Basifrit—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.
Beacor—Valves. Beaton & Corbin Mfg. Co., Southington, Conn.
Beauticast—Radiation. Columbia Radiator Co., McKeesport, Pa.
Beaverkill—Leather belting and v-belts. Baldwin Belting, Inc., New York, N. Y.
Beco-Cell—Corrosion treatment. Brown Electro Co., Oklahoma City, Okla.
Belco—Fans, louvers and shutters. Belter Electric Mfg. Co., G. J., The, St. Louis, Mo.
Bell-Pack—Clamps. Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Beloit—Machines, punches, power shears. Hendley & Whittemore Co., Beloit, Wis.
Bend-Ezy—Grilles, registers. Standard Stamping & Perforating Co., Chicago, Ill.
Bendmaster—Tubing benders. Leonard Precision Products Co., Garden Grove, Calif.
Bermico—Fiber glass. Brown Co., New York, N. Y.
Bestfelt—Insulation. Keasbey & Mattison Co., Ambler, Pa.
Beth-Co-Weld—Pipe. Bethlehem Steel Co., Bethlehem, Pa.
Beth-Cu-Loy—Sheets. Bethlehem Steel Co., Bethlehem, Pa.
Bi-Air—Burners. John Zink Co., Tulsa, Okla.
Bifurcator—Fans. DeBothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Bildrite—Insulation. Insulite Co., Minneapolis, Minn.
Bi-Mix—Burners. John Zink Co., Tulsa, Okla.
Binoc—Thermometers. Taylor Instrument Companies, Rochester, N. Y.
Bison—Boilers. Farrar & Trefts, Buffalo, N. Y.
Bitumastic—Protective coatings. Koppers Co., Inc., Pittsburgh, Pa.
Bituminous—Coatings. Robertson Co., H. H., Pittsburgh, Pa.
Bituplastic—Coatings. Koppers Co., Inc., Pittsburgh, Pa.
Black Baking Japans—Enamels and lacquers. Hilo Varnish Co., Brooklyn, N. Y.
Black Magic—Pipe covering adhesives. Miracle Adhesives Corp., New York, N. Y.
Black Magic—Cement and compounds. Bowser, Inc., Fort Wayne, Ind.
Blazecrete—Refractories. Johns-Manville, New York, N. Y.
Bloapco—Dust collectors. Blower Application Co., Milwaukee, Wis.
Blo-Cold—Unit coolers. Acme Industries, Inc., Jackson, Mich.
Bloflex—Hose. American Ventilating Hose Co., New York, N. Y.
Blowertrol—Speed changers. White Mfg. Co., St. Paul, Minn.
Blu-Cold—Compressors. Lehigh Mfg. Co., Div. of Lehigh Foundries, Inc., Lancaster, Pa.
Blueknight—Enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Blue-Point—Tools, wrenches. Snap-on Tools Corp., Kenosha, Wis.
Blue Ribbon—Headers and nipples. Chicago Nipple Mfg. Co., Cicero, Ill.
Blue Streak—Blueprint machines. Paragon-Revolute Corp., Rochester, N. Y.
Boardman—Pump governors. Locke Regulator Co., Salem, Mass.
Bob—Float valves. Robert Mfg. Co., Los Angeles, Calif.
Boilergard—Low water cut-offs. Maid-O'-Mist, Inc., Chicago, Ill.
Boiler Solder Seal—Compounds. Radiator Specialty Co., Charlotte, N. Carolina.
Boylout—Cleaning compounds, steam treatment. Apex Engineering Co., Chicago, Ill.
Brad-Ray—Radiant heating coils and panels. Jos. L. Bradfield, Indianapolis, Ind.
Branford—Oil burners, unions. Malleable Iron Fittings Co., Branford, Conn.
Brassweld—Compounds. Sight Feed Generator Co., West Alexandria, O.
Brazo—Solder. Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Breathe-O-Stat—Thermostats. McLarty Systems, Battle Creek, Mich.
Breeze Spreader—Propeller fans. Victor Electric Products, Inc., Cincinnati, O.
Breezo—Fans. Buffalo Forge Co., Buffalo, N. Y.
Breezy-Air—Air conditioning units. Barwick Mfg. Corp., Wichita, Kan.
Brommell—Eliminators, floats, heating systems, traps, valves. Vapor Specialty Co., New York, N. Y.
Bronzende—Electrodes. Arcos Corp., Philadelphia, Pa.
Bronzeweld—Compounds. Sight Feed Generator Co., West Alexandria, O.
BTUnit—Unit heaters. Industrial Mfg. & Engineering Co., Chicago, Ill.
Budget—Water heaters. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Bulator—Grilles. Hendrick Mfg. Co., Carbondale, Pa.
Bulldog—Shears and snips. Wiss & Sons Co., J., Newark, N. J.
Bull Dog—Stocks and dies. Oster Mfg. Co., Cleveland, O.
Bull Dog—Pipe and tubing. Phelps Dodge Copper Products, British American Tube Div., New York, N. Y.
Bull Dog—Valves. The Carpenter Mfg. Corp., Cleveland, O.
Bundyflex—Steel tubing. Everhot Products Co., Chicago, Ill.
Bundyweld—Tubes and tubing. Bundy Tubing Co., Detroit, Mich.
Bunker Hill—Fittings, pipe, sheets, solder. Northwest Lead Co., Seattle, Wash.
Burks—Pumps. Decatur Pump Co., Decatur, Ill.
Burnham—Compressors, condensors, pumps. Union Steam Pump Co., Battle Creek, Mich.

C-E—Boilers, burners, stokers, fuel economizers. Combustion Engineering-Superheater, Inc., New York, N. Y.
C-H—Alarms, controllers and starters, heaters, relays, regulators, switches, valves. Cutler-Hammer, Inc., Milwaukee, Wis.
CJB—Bearings. Ahlberg Bearing Co., Chicago, Ill.
C & M—Hangers or brackets. Carty & Moore Engineering Co., Detroit, Mich.
CMH—Bellows, pipe joints. Chicago Metal Hose Corp., Maywood, Ill.
COM—Blowers. Wing Mfg. Co., L. J., New York, N. Y.
C & R—Regulators. Automatic Control Co., St. Paul, Minn.
CSP—Transformers. Westinghouse Electric Corp., Pittsburgh, Pa.
CW—Pipe. Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Cadillac—Meters. Central Station Steam Co., Detroit, Mich.
Cadman—Valves. Barrett Machine Co., Pittsburgh, Pa.
Cadwell—Pressure regulators, valves. Beaton & Cadwell Mfg. Co., New Britain, Conn.

Calco—Valves. California Brass Mfg. Co., Los Angeles, Calif.
Calktite—Cement and compounds. U. S. Stoneware Co., New York, N. Y.
Calorex—Oil burners. W. N. Best Combustion Equipment Co., Inc., New York, N. Y.
Cantilever—Hygrometers. Standard Thermometer, Inc., Boston, Mass.
Capacilogs—Temperature recorders. Wheelco Instruments Co., Chicago, Ill.
Capacitrols—Indicator-controllers. Wheelco Instruments Co., Chicago, Ill.
Capillary—Air washers. Clarage Fan Co., Kalamazoo, Mich.
Capillary—Air washers, humidifiers, unit air conditioners. Air & Refrigeration Corp., New York, N. Y.
Capitol—Boilers, hanger or brackets, heaters, radiation. United States Radiator Corp., Detroit, Mich.
Capitol—Insulation. Standard Lime & Stone Co., Baltimore, Md.
Carbolite—Soot destroyers. Ampion Corp., Long Island City, N. Y.
Careyduct—Ducts and duct fittings, insulation, non-metallic sheets, duct turning vanes. Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Cash-Acme—Heating systems, pipe strainers, regulators, valves. Cash Valve Mfg. Co., A. W., Decatur, Ill.
Castalu—Fans, wheels. Advance Aluminum Castings Corp., Chicago, Ill.
Cast-Refract—Refractories. Quigley Co., Inc., New York, N. Y.
Catch-All—Dehydrators. Sporlan Valve Co., St. Louis, Mo.
Causul—Valves. Lunkenheimer Co., Cincinnati, O.
Celeritas—Colorimeters. Daigger & Co., A., Chicago, Ill.
Celeron—Couplings, fittings. Continental Diamond Fibre Co., Newark, Del.
Cell-U-Blanket—Insulation. Masonite Corp., Chicago, Ill.
Cellufoam—Insulation. Masonite Corp., Chicago, Ill.
Celo-Siding—Insulation. Celotex Corp., The, Chicago, Ill.
Cemcoat—Enamels and lacquers. Sonneborn Sons, Inc., New York, N. Y.
Cementseal—Enamels and lacquers. Acorn Refining Co., Cleveland, O.
Cemesto—Insulation. Celotex Corp., The, Chicago, Ill.
Central Aire—Unit air conditioners. Baker Refrigeration Corp., South Windham, Me.
Central—Conduit. Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Centrimax—Meters. Leeds & Northrup Co., Philadelphia, Pa.
Centripac—Packing. Johns-Manville, New York, N. Y.
Centripeller—Roof ventilators. Jordan & Co., Paul R., Indianapolis, Ind.
Chaco—Boiler and radiator sealing compounds. Desolvo Co., The, Pittsburgh, Pa.
Challenger—Propeller fans. Signal Electric Mfg. Co., Menominee, Mich.
Champion—Furnaces, heaters. National Heater Co., St. Paul, Minn.
Champion—Gas fired heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Champion—Pumps. Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Chan-L-Mounts—Bases and pads. Lord Mfg. Co., Erie, Pa.
Chem-o-Feeder—Feeders, pumps, water treatment. % Proportioneers, Inc., % Providence, R. I.
Chenco—Compounds, water treatment. Chemical Engineering Co., Dallas, Tex.
Chevron—Packing. Garlock Packing Co., Palmyra, N. Y.
Chicago—Brakes. Dreis & Krump Mfg. Co., Chicago, Ill.
Chicago—Stokers. Eddy Stoker Corp., Chicago, Ill.
Chicago—Stokers. Standard Stoker Co., Inc., Erie, Pa.
Chicago-Wrigley—Bolts. Chicago Expansion Bolt Co., Chicago, Ill.
Chico Brikset—Cement. Chicago Fire Brick Co., Chicago, Ill.
Chieftain—Compressors. Tecumseh Products Co., Tecumseh, Mich.
Chill Air—Air conditioning units. National Engineering & Mfg. Co., Kansas City, Mo.
Chill-Vactor—Chillers and steam jet compressors. Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Chimney Sweep—Chemical destroyers. Coughlan Co., G. N., West Orange, N. J.
Chinook—Ferrous heating surface. Bayley Blower Co., Milwaukee, Wis.
Chinookfin—Ferrous heating surface. Bayley Blower Co., Milwaukee, Wis.
Chlorimet—Heat exchangers, fans, fittings, heaters, pipe, pumps, sheets, valves. Duriron Co., Inc., The, Dayton, O.
Chore Boy—Burners. Standard Fuel Engineering Co., Detroit, Mich.
Chromalox—Preheaters, unit heaters. Wiegand Co., Edwin L., Pittsburgh, Pa.
Chrome Lock—Gaskets. Products Research Co., Los Angeles, Calif.
Chromend—Electrodes. Arcos Corp., Philadelphia, Pa.
Chromeweld—Electrodes. Lincoln Electric Co., The, Cleveland, O.
Chromix—Refractories. Quigley Co., Inc., New York, N. Y.
Chronoflo—Flow meters, recorders. Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Chronometer—Valves. Defender Instrument & Regulator Co., St. Louis, Mo.
Chronotherm—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Cinch—Expansion bolts. National Lead Co., New York, N. Y.
Circle T—Switches. Trumbull Electric Co., The, Plainville, Conn.
Circo—Louvres and shutters, fan housings. Circulators & Devices Mfg. Co., New York, N. Y.
Clair-Bond—Adhesives. St. Clair Rubber Co., Detroit, Mich.
Clamp-A-Leak—Pipe repair clamps. Chelsea Metal Stamping Co., New York, N. Y.
Clarco—Unit heaters. Clarage Fan Co., Kalamazoo, Mich.
Classic—Registers. Auer Register Co., Cleveland, O.
Cle-Bar—Heaters. Cleghorn Co., Boston, Mass.
Clevite—Bearings. Cleveland Graphite Bronze Co., Cleveland, O.
Cliff—Boilers, water heaters. Terre Haute Boiler Works Co., Terre Haute, Ind.
Climate Changer—Unit air conditioners, unit air coolers. Trane Co., The, La Crosse, Wis.
Climatrol—Boilers, furnaces, heaters, fans, metallic ducts. Mueller Furnace Co., L. J., Milwaukee, Wis.
Clime-Matic—Unit air conditioner. United Conditioning Corp., New York, N. Y.
Clipper—Fans. Trade-Wind Motorfans, Inc., Los Angeles, Calif.
Clipper—Seals. Johns-Manville, New York, N. Y.
Clorodine—Boiler cleaning compounds. American Chemical Paint Co., Ambler, Pa.
Closin—Bolts. Star Expansion Bolt Co., New York, N. Y.
Cocheo—Belting. Williams & Son, I. B., Dover, N. H.
Coey—Mechanical draft towers. United Conditioning Corp., New York, N. Y.
Colalloy—Couplings, nipples, pipe. Colonial Alloys Co. Metals Div., Philadelphia, Pa.
Coldjet—Unit coolers, air conditioning units. Industrial Mfg. & Engineering Co., Chicago, Ill.
Coltemp—Insulation. Badham Insulation Co., Inc., Birmingham, Ala.
Columbia—Odor adsorbers. Carbide and Carbon Chemicals Corp., Unit of Union Carbide and Carbon Corp., New York, N. Y.
Columbia—Ventilators. E. E. Souther Iron Co., St. Louis, Mo.
Combustioneer—Stokers. Steel Products Engineering Co., Springfield, O.
Comet—Fans, unit heaters. New York Blower Co., Chicago, Ill.
Comfort-Air—Air washers. Comfort Products Corp., Dallas, Tex.
Comfort Master—Barometric controls. Automatic Products Co., Milwaukee, Wis.
Comfort Panel—Radiation. Columbus Radiator Co., McKeesport, Pa.
Comfortrol—Switches. Holcomb & Hoke Mfg. Co., Inc., Indianapolis, Ind.
Comfostat—Thermostats. Johnson Service Co., Milwaukee, Wis.
Co-Min-Co—Insulating cement. United States Mineral Wool Co., South Milwaukee, Wis.
Compact-Boilers. Titusville Iron Works Co., The, Titusville, Pa.
Compass—Belting. Goodyear Tire & Rubber Co., Akron, O.
Compound Lever—Hand shears and snips. Bartlett Mfg. Co., Detroit, Mich.
Conco—Boiler cleaning compounds, water treatment. Continental Products Co., Euclid, O.
Condor—Belting, V belts, pipe. Raybestos-Manhattan, Inc., Passaic, N. J.
Condo-Vac—Vacuum pumps. Chicago Pump Co., Chicago, Ill.
Coni-Vane—Ventilators. Allen Ventilator Div., Production Planning Co., Rochester, Mich.
Conomotors—Duct and valve operators. Conoflow Corp., Philadelphia, Pa.
Conseco—Water chillers, tube cleaners, coils, compressors, condensers, oil coolers, dryers, heat exchangers, filters, headers, water heaters, joints, preheaters, pumps, separators, superheaters, tanks, cooling towers. Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Consolidated—Valves. Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Con-Tac-Tor—Switches. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Convect-O-Base—Baseboard radiation. Minimite Co., Chicago, Ill.
Convect-O-Fin—Fin tube radiation, tubing. Minimite Co., Chicago, Ill.
Convector—Humidifiers. Maid-O'-Mist., Inc., Chicago, Ill.
Converto—Roof ventilators. Ammerman Co., C. L., Minneapolis, Minn.
Conveyoflo — Conveyors. Builders-Providence, Inc., Providence, R. I.
Conveyor—Pulleys and sheaves. The American Pulley Co., Philadelphia, Pa.
Coolair—Fans, louvers and shutters, ventilators, ventilator units. American Coolair Corp., Jacksonville, Fla.
Cooleraire—Air conditioning units. Payne Furnace Co., Monrovia, Calif.
Coolero—Ventilators. Hirschman-Pohle Co., Inc., LeRoy, N. Y.
Coolite—Windows. Mississippi Glass Co., New York, N. Y.
Coolmaster—Unit coolers. Kramer Trenton Co., Trenton, N. J.
Cool Spot—Propeller fans. Signal Electric Mfg. Co., Menominee, Mich.
Copaltite—Cement and compounds, gaskets. National Engineering Products, Inc., Washington, D. C.
Copes—Governors, regulators, steam desuperheaters, valves, water alarms, indicators. Northern Equipment Co., Erie, Pa.
Cop-R-Loy—Sheets. Wheeling Steel Corp., Wheeling, W. Va.
Copr-Tube—Fittings. Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Coravol—Corrosion treatment. Western Chemical Co., Kansas City, Mo.
Cornelius—Air compressors and regulators. North Penn Co., New York, N. Y.
Corosex—Water treatment. Research Products Corp., Madison, Wis.
Corozone—Ionization and ozone apparatus. Coroaire Heater Corp., The, Cleveland, O.
Corrodicide—Water treatment. Metropolitan Refining Co., Inc., Long Island City, N. Y.
Corrodine—Corrosion inhibition. Metropolitan Refining Co., Inc., Long Island City, N. Y.
Cotoid—Coatings. Lithgow Corp., Chicago, Ill.
Cottrell—Dust collectors. Research Corp., New York, N. Y.
Cottrell—Dust collectors. Western Precipitation Corp., Los Angeles, Calif.
Coxe—Stokers. Combustion Engineering-Superheater, Inc., New York, N. Y.
Co-Z-Air—Electric radiators. Conco Engineering Wks., Div. of H. D. Conkey & Co., Mendota, Ill.
Crescent—Boiler gage cocks. Wright-Austin Co., Detroit, Mich.
Crescent—Unions. Star Mfg. Co., Inc., Providence, R. I.
Croloy—Pipe, tubes, and tubing. Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Cromaloy—Solder. Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Cross-Flo—Dehydrators. Remco, Inc., Zelienople, Pa.
Crown—Cement and compounds. Colebrook & Sons, Inc., W. H., Syracuse, N. Y.
Crystals—Enamels and lacquers. Hilo Varnish Corp., Brooklyn, N. Y.
Cushion-Cradled—Burners. Century Engineering Corp., Cedar Rapids, Ia.
Custom Built—Unit air conditioners. Baker Refrigeration Corp., South Windham, Me.
Cut Master—Vertical turret lathes. Bullard Co., The, Bridgeport, Conn.
Cutno—Packing. Greene, Tweed & Co., North Wales, Pa.
Cycloidal—Air washers. Blower Application Co., Milwaukee, Wis.
Cycoil—Filters. American Air Filter Co., Louisville, Ky.
Cyclone—Exhaust heads. Wright Austin Co., Detroit, Mich.
Cyclops—Roller bearings. Roller Bearing Co. of America, Trenton, N. J.

DFN—Dehydrators, filters. McIntire Connector Co., Newark, N. J.
DFN Du-cal Drierite—Dehydrators, McIntire Connector Co., Newark, N. J.
DH—Ball bearings. Dodge Mfg. Corp., Mishawaka, Ind.
D.I.P.—Insulation, piping. Durant Insulated Pipe Co., Palo Alto, Calif.
DV—V-belt drives. Dodge Mfg. Corp., Mishawaka, Ind.
Daptoblu—Gas burners. Beck Engineering Combustion Kompany, St. Louis, Mo.
Dart—Unions. Fairbanks Co., New York, N. Y.
Dawnblast—Unit heaters. Sturtevant Co., B. F., Div. of Westinghouse Electric, Boston, Mass.
Day-Nite Acratherm—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Day-Steel—Pulleys. Dayton Rubber Co., Dayton, O.
Dean—Cleaners. Pierce Co., Wm. B., The, Buffalo, N. Y.
Debecote—Coatings. Debevoise Co., The, Brooklyn, N. Y.
Deflecto—Ventilators. Day Co., The, Minneapolis, Minn.
Deflecto-Grilles—Grilles. United States Air Conditioning Corp., Minneapolis, Minn.
Defrostolator—Hot gas defrosting systems. Tenney Engineering, Inc., Newark, N. J.
Demandtrol—Valves. Gold Top Heating, Inc., Butte, Mont.
Demon Air-Set—Refractories. Plibrico Jointless Firebrick Co., Chicago, Ill.
Deoxidine—Cleaning compounds. American Chemical Paint Co., Ambler, Pa.
Dereka—Protective coatings. Debevoise Co., The, Brooklyn, N. Y.

Desert Air—Heaters, burners. Central States Mfg. Co., Inc., Arkansas City, Kan.

Desmond-Simplex—Pipe vises. Desmond-Stephan Mfg. Co., Urbana, O.

De-Sta-Co.—Fan housings, pipe clamps, valves. Detroit Stamping Co., Detroit, Mich.

Detroit—Traps. Nason Co., Detroit, Mich.

Detroit LoStoker—Stokers. Detroit Stoker Co., Detroit, Mich.

Detroit Rotograte Stoker—Stokers. Detroit Stoker Co., Detroit, Mich.

Detroit Rotostoker—Stokers. Detroit Stoker Co., Detroit, Mich.

Detroit Unistoker—Stokers. Detroit Stoker Co., Detroit, Mich.

Dexter—Valve reseaters, air separators, steam traps. Leavitt Machine Co., Orange, Mass.

Di-Acro—Benders, brakes, shears. O'Neil Irwin Mfg. Co., Lake City, Minn.

Dial—Regulators. Parker-Kalon Corp., New York, N. Y.

Dialon—Radiator valves, Bridgeport Brass Co., Bridgeport, Conn.

Diamond—Cement. Green Fire Brick Co., Mexico, Mo.

Diamond—Compounds, enamels and lacquers. Thompson & Co., Oakmont, Pa.

Diamond Fibre—Gaskets. Continental Diamond Fibre Co., Newark, Del.

Diamond H—Switches, thermostats, regulators. Hart Mfg. Co., Hartford, Conn.

Diaphlex—Controls. Cook Electric Co., Diaphlex Div., Chicago, Ill.

Dia-Seal—Valves. Imperial Brass Mfg. Co., Chicago, Ill.

Dickbelt—Belting and drives. Dick Co., Inc., R. & J., Passaic, N. J.

Dickinson Ferrocast—Exhaust heads, ventilators. Dickinson, Aeolus, Chicago, Ill.

Dickrope—V belts and drives. Dick Co., Inc., R. & J., Passaic, N. J.

Dickvalve—Valves. Dick Co., Inc., R. & J., Passaic, N. J.

Dieselite—Corrosion prevention. Metropolitan Refining Co., Inc., Long Island City, N. Y.

Dilecto—Plastic pipe. Continental Diamond Fibre Co., Newark, Del.

Direct—Pipe fittings and flanges. Straight Line Foundry & Machine Corp., Direct Separator Div., The, Syracuse, N. Y.

Directrol—Vanes. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.

Discfin—Cooling surface. General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.

Disc-Loc—Registers. Knowles Mushroom Ventilator Co., Upper Montclair, N. J.

Disseminator—Compounds. Ampion Corp., Long Island City, N. Y.

Distributor—Radiation. Kehm Corp., The, Chicago, Ill.

Divco—Pipe and tubing, sheets, valves. Division Lead Co., Chicago, Ill.

Dix—Universal joints. Lovejoy Flexible Coupling Co., Chicago, Ill.

Dixielectric—Boilers. Livingstone Engineering Co., Worcester, Mass.

Dixigas—Gas welding rod. Atlantic Steel Co., Atlanta, Ga.

Dixisteel—Pipe hangers and supports. Atlantic Steel Co., Atlanta, Ga.

Do-All—Combination hammer and drill. Wodack Electric Tool Corp., Chicago, Ill.

Dominion—Gaskets, packing. Darcoid Co., Inc., New York, N. Y.

Dorex—Adsorbers. W. B. Connor Engineering Corp., New York, N. Y.

Double Check—Boiler compounds. Hampton-Cross Co., The, Louisville, Ky.

Double Diamond—Hygrometers, recorders, psychrometers. H-B Instrument Co., Philadelphia, Pa.

Double-Seal—Copper tube fittings. Hays Mfg. Co., Erie, Pa.

Double U—Packing. Wayne Davies & Co., Westboro, Mass.

Dowmetal—Sheets, tubing, welding rod. Dow Chemical Co., Midland, Mich.

Downblast—Unit heaters. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.

Dowtherm—Process heating systems. Dow Chemical Co., The, Midland, Mich.

Draft-A-Justor—Draft controls. Preferred Utilities Mfg. Corp., New York, N. Y.

Draftender—Regulators. Penn Electric Switch Co., Goshen, Ind.

Draft-O-Stat—Barometric controls. Hotstream Heater Co., Cleveland, O.

Draftrite—Gages. Bacharach Industrial Instrument Co., Pittsburgh, Pa.

Draftrite—Gages. Cole-Sewell Engineering Co., St. Paul, Minn.

Drainator—Traps. Coe Mfg. Co., Painesville, O.

Drain-Dri—Sump pumps. Yeomans Bros. Co., Chicago, Ill.

Draintrol—Traps. Schaub Engineering Co., Inc., Fred H., Chicago, Ill.

Dresserell—Fittings. Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.

DriAir—Dehumidifiers. Tamms Industries, Inc., Chicago, Ill.

Drift Retriever—Cooling towers. Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.

Dri-Pipe—Insulation. Mystik Adhesive Products Div., Chicago Show Printing Co., Chicago, Ill.

Drive-IT—Hangers and supports, welders. Powder Power Tool Corp., Portland, Ore.

Dri-vent—Radiator air valves. Frank D. Riggio Co., Rutherford, N. J.

Dry-Ex—Water chillers. Acme Industries, Inc., Jackson, Mich.

Dry-Ice—Refrigerants. Pure Carbonic, Inc., New York, N. Y.

Drynamic—Dehumidifiers. Cargocaire Engineering Corp., New York, N. Y.

Dry-paC—Insulation. Ric-wiL Co., Cleveland, O.

Dryvin—Expansion bolts. Star Expansion Bolt Co., New York, N. Y.

Dualarc—Arc Welders. Electric Arc, Inc., Newark, N. J.

Dual-Clone—Dust collectors. Day Co., The, Minneapolis, Minn.

Dual-A-Fire—Burners. Automatic Firing Corp., St. Louis, Mo.

Dualene—Fuel oil treatment. Allen Co., Robert G., Mechanicsville, N. Y.

Dualsteel—Unions. Rockwood Sprinkler Co., Worcester, Mass.

Duboth—Boiler water treatment. Metropolitan Refining Co., Inc., Long Island City, N. Y.

Duco—Enamels and lacquers, du Pont de Nemours & Co. (Inc.), E. I., Fabrics & Finishes Dept. Wilmington, Del.

Ductatherm—Thermostats. Mercoid Corp., The, Chicago, Ill.

Ducturns—Vanes. Tuttle & Bailey, Inc., New Britain, Conn.

Ductype—Fans. South Bend Air Products, Inc., South Bend, Ind.

Dulrae—Electrical radiant heating conductors. Crittall Radiant Heating, Inc., Richard, New York, N. Y.

Dulux—Enamels and lacquers. du Pont de Nemours & Co. (Inc.) E. I., Fabrics & Finishes Dept., Wilmington, Del.

Duo Blo—Air heaters. American Furnace Co., St. Louis, Mo.

Duoflo—Pipe line strainers. Sheffler-Gross Co., Philadelphia, Pa.

Duo-Stat—Heating systems, thermostats. Johnson Service Co., Milwaukee, Wis.

Duotrol—Regulators. Automatic Control Co., St. Paul, Minn.

Duplex—Insulation. Keasbey & Mattison Co., Ambler, Pa.

Duplex—Pipe cutting machines. Bignall & Keeler Div., John Ramming Machine Co., St. Louis, Mo.

Durabel—Coatings. Perolin Co., Inc., Chicago, Ill.

Durabilt—Observation ports, conveyors. Chicago Fire Brick Co., Chicago, Ill.

DuraBilt—Registers. Auer Register Co., Cleveland, O.

Duradiant—Gas burners. Selas Corp. of America, Philadelphia, Pa.

Dura-Flex—Registers. Auer Register Co., Cleveland, O.

Duraflex—Stokers. Canton Stoker Corp., Canton, O.

Dura-Line—Registers. Auer Register Co., Cleveland, O.

Duranite—Enamels and lacquers. Atlas Powder Co., North Chicago, Ill.

DuraSpeed—Sprinkler heads. Grinnell Co., Inc., Providence, R. I.

Duratex—Protective coatings. National Pipe Coatings, Inc., Los Angeles, Calif.

Durco—Fans, fittings, pipe, valves. Duriron Co., Inc., Dayton, O.

Durcopump—Fans, fittings, pipe, valves. Duriron Co., Inc., Dayton, O.

Durex—Bearings. Moraine Products Div., General Motors Corp., Dayton, O.

Durichlor—Fans, fittings, pipe, valves. Duriron Co., Inc., Dayton, O.

Duridine—Protective coatings. American Chemical Paint Co., Ambler, Pa.

Durimet—Fans, fittings, pipe, valves. Duriron Co., Inc., Dayton, O.

Durobrace—Pulleys and sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Duro Gloss—Steel sheets. Jessop Steel Co., Washington, Pa.

Dustex—Dust collectors. Dust Filter Co., Chicago, Ill.

Dustkop—Dust collectors. Aget-Detroit Co., Ann Arbor, Mich.

Dust-Stop—Air Filters. Owens-Corning Fiberglas Corp., Toledo, O.

Dust Trap—Filters. Morf Industries, Inc., Staten Island, N. Y.

Dustube—Dust collectors. American Wheelabrator & Equipment Corp., Mishawaka, Ind.

Dutch Boy—Solder. National Lead Co., New York, N. Y.

Duxbak—Leather belting and packing. Schieren Co., Chas. A., New York, N. Y.

Dux-Sulation—Insulation. Grant Wilson, Inc., Chicago, Ill.

Dynaflow—Fans. South Bend Air Products, Inc., South Bend, Ind.

Dyna-Line—Electric motors. Brown-Brockmeyer Co., Inc., Dayton, O.

Dynamaster—Recorders. Bristol Co., The, Waterbury, Conn.

Dyna-Speed—Electric motors. Brown-Brockmeyer Co., Inc., Dayton, O.

Dynatherm—Water heaters. Bethlehem Foundry & Machine Co., Bethlehem, Pa.

Dynetric—Balancing equipment. Gisholt Machine Co., Madison, Wis.

E.A.D.—Motors. Eastern Air Devices, Inc., Brooklyn, N. Y.

E-C—V belts. Goodyear Tire & Rubber Co., Akron, O.

E C & M—Motor controls, switches. Electric Controller & Mfg. Co., Cleveland, O.

EMD—Blowers. L. J. Wing Mfg. Co., New York, N. Y.

E-Z—Registers, regulators. Acme Mfg. Co., Philadelphia, Pa.

E.Z.—Hangers or brackets, soot destroyers. Healy Ruff Co., St. Paul, Minn.

Eagle—Clamps, hose. Actus Corp., Mount Vernon, N. Y.

Eastern—Tanks. Case & Son Mfg. Co., W. A., Buffalo, N. Y.

Easy-Flo—Solder. Handy & Harman, New York, N. Y.

Ebko—Conduit, exchangers, pipe. Kaiser Co., E. B., Chicago, Ill.

Eclipse—Hose. Bendix Aviation Corp., Eclipse-Pioneer Div., Teterboro, N. J.

Eclipse—Reciprocating compressors. Frick Co., Waynesboro, Pa.

Econofeed—Pumps, systems. Dutton Co., C. H., Kalamazoo, Mich.

Econolux—Boilers. Johnson Co., S. T., Philadelphia, Pa.

Economist—Boilers. Dutton Co., C. H., Kalamazoo, Mich.

Economite—Commercial and industrial gas burners. Mid-Continent Metal Products Co., Chicago, Ill.

Economizer—Nozzles. Bahnson Co., Winston-Salem, N. C.

Economy—Boilers, heaters. International Heater Co., Utica, N. Y.

Economy—Regulators. Dockson Corp., Detroit, Mich.

Economy—Unit ventilators. Arex Co., Chicago, Ill.

Econostat—Heating systems. Barber-Colman Co., Rockford, Ill.

Econotherm—Boilers. Dutton Co., C. H., Kalamazoo, Mich.

Econovent—Ventilators. Western Engineering & Mfg. Co., Los Angeles, Calif.

Edgeseal—Air filters. Wilson & Co., Inc., Chicago, Ill.

Edgetallic—Gaskets. Darcoid Co., Inc., New York, N. Y.

Effecto-Grille—Grilles, registers. Turnbull Mfg. & Dist. Co., Detroit, Mich.

Effico—Ventilators. Hirschman-Pohle Co., Inc., LeRoy, N. Y.

"88"—Pipe covering. Eagle-Picher Co., Cincinnati, O.

Elastic Metallic—Packing. Austin-Mason Co., Everett, Mass.

Elasto Rib—Vibration isolating bases. Korfund Co., Inc., Long Island City, N. Y.

Electric Filter Watchman—Gages. Herbusch Corp., The, St. Louis, Mo.

Electrifugal—Centrifugal pumps. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Electriglass—Conductors. Appleman Glass Works, Bergenfield, N. J.

Electro-Airmat—Air cleaners. American Air Filter Co., Inc., Louisville, Ky.

Electro-Cell—Air cleaners. American Air Filter Co., Inc., Louisville, Ky.

Electroflo—Valves. Hays Mfg. Co., Erie, Pa.

Electrofluid—Hydraulic speed changers. Link-Belt Co., Philadelphia, Pa.

Electro-Hot—Heaters. Red Spot Electric Co., Tacoma, Wash.

Electro-Mist Collector—Air cleaners. American Air Filter Co., Inc., Louisville, Ky.

Electro-Pl—Air cleaners. American Air Filter Co., Inc., Louisville, Ky.

Electro-Rod—Pipe cleaning machines. Spartan Tool Co., Chicago, Ill.

Electro-Sheet—Sheets. American Brass Co., Waterbury, Conn.

Electroweld—Welders. Electric Arc., Inc., Newark, N. J.

Electro-Wind—Ventilators. Allen Ventilator Div., Production Planning Co., Rochester, Mich.

Electrunite—Stainless steel tubing, tubing benders. Republic Steel Corp., Steel & Tubes Div., Cleveland, O.

Elesco—Superheaters. Combustion Engineering-Superheater, Inc., New York, N. Y.

Elgex—Steam system treatment. Elgin Softener Corp., Elgin, Ill.

Elgin—Arc welders. Borm Mfg. Co., Elgin, Ill.

Elgin—Louvers and shutters. Elgo Shutter & Mfg. Co., Detroit, Mich.

Elite—Registers. Auer Register Co., Cleveland, O.

Elm—Dampers. Elgo Shutter & Mfg. Co., Detroit, Mich.

Elsco—Blowers, compressors, pumps, valves. Electric Sprayit Co., The, Sheboygan, Wis.

Embee—Cement and compounds. Montgomery Bros., San Francisco, Calif.

Emco—Meters, regulators. Pittsburgh Equitable Meter Div., Rockwell Mfg. Co., Pittsburgh, Pa.

Emergency—Traps. Wright-Austin Co., Detroit, Mich.

Empire—Water meters. Pittsburgh Equitable Meter Div., Rockwell Mfg. Co., Pittsburgh, Pa.

Enamel-Kote—Enamels and lacquers. Acme White Lead & Color Works, Detroit, Mich.

Enco—Burners, regulators, cooling units. Engineer Co., New York, N. Y.
Enduro—Sheets, tubing. Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
Enduro—Unions. Jefferson Union Co., Inc., New York, N. Y.
Enpo—Motors, pumps, circulators. Piqua Machine & Mfg. Co., Piqua, O.
Entrained Combustion—Gas burners. Mettler Co., Lee B., Los Angeles, Calif.
Equatemp—Balancing valves. Ohio Brass Co., Mansfield, O.
Equatherm—Zone control thermostat. Tallmadge & Co., Webster, East Orange, N. J.
Equiflo—Valves. Grinnell Co., Inc., Providence, R. I.
Eroduct—Insulation. Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Esna—Nuts. Elastic Stop Nut Corp. of America, Union, N. J.
Esso—Oil burners, heaters. Gilbert & Barker Mfg. Co., West Springfield, Mass.
Esso Bond—Cement, refractories. Ramtite Co., The, Chicago, Ill.
Eutec-Arc—Arc welders, welding and cutting apparatus. Eutectic Welding Alloys Corp., New York, N. Y.
Eutecrod—Welding compounds, rods, solder. Eutectic Welding Alloys Corp., New York, N. Y.
Eutectrode—Welding electrodes. Eutectic Welding Alloys Corp., New York, N. Y.
Evactor—Pumps. Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Evapotrol—Valves. Alco Valve Co., St. Louis, Mo.
Evanaction—Valves. Taylor Instrument Companies, Rochester, N. Y
Everflex—Hose, coils, and tubing. Everhot Products Co., Chicago, Ill.
Everjet—Coatings. Barrett Div., Allied Chemical & Dye Corp., New York, N. Y.
Everlasting—Bolts and studs. H. M. Harper Co., Morton Grove, Ill.
Eversharp—Cutters. Everhot Products Co., Chicago, Ill.
Evertite—Clamps. Everhot Products Co., Chicago, Ill.
Evrtyte—Valves. Strong, Carlisle & Hammond Co., Cleveland, O.
Excel—Unions. Jefferson Union Co., Inc., New York, N. Y
Excelsior—Pumps. Foster Pump Works, Inc., Brooklyn, N. Y.
Excelso—Water heaters. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Exhaustair—Fans. New York Blower Co., Chicago, Ill.
Exidust—Dust collectors. Allen Billmyre Div., Lamson Corp., Syracuse, N. Y.
Extra Dry Esotoo—Liquid sulphur dioxide. Virginia Smelting Co., West Norfolk, Va.
Eye-Hye—Gages, indicators. Reliance Gauge Column Co., Cleveland, O.
Ez-arc—Arc welders. Will-Weld Mfg. Co., Inc., Omaha, Neb.
E-Z-On—Regulators. Gerrett Corp., M. A., Milwaukee, Wis.
E-Z-See—Glasses. Remco, Inc., Zelienople, Pa.
Ezy-Kleen—Strainers. Blackmer Pump Co., Grand Rapids, Mich.

F & E—Stokers. Flynn & Emrich Co., Baltimore, Md.
FS—Bellows. Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
F & T—Boilers. Farrar & Trefts, Buffalo, N. Y.
Fabrikated—Grilles, registers. Independent Register Co., Cleveland, O., New York, N. Y
Faircoseal—Valves. Fairbanks Co., New York, N. Y.
Fan-Air—Gas burners. Mettler Co., Lee B., Los Angeles, Calif.
Fanmix—Burners. Coppus Engineering Corp., Worcester, Mass.
Fan-Pac—Fans. DeBothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill
Far-Air—Air conditioning units, filters, humidifiers. Farr Co., Los Angeles, Calif.
Farragut—Packing. Darcoid Co., Inc., New York, N. Y.
Fast's—Couplings. Koppers Co., Inc., Pittsburgh, Pa.
Favorite—Ratchet wrenches. Greene, Tweed & Co., North Wales, Pa.
Featherfin—Heating and cooling surface. Wing Mfg. Co., L. J., New York, N. Y.
Featherweight—Propeller fans. Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Featherweight—Unit heaters. Wing Mfg. Co., L. J., New York, N. Y.
Feed-Rator—Chemical feeders. Fischer & Porter Co., Hatboro, Pa.
Fel-Pro—Gaskets, packing Felt Products Mfg. Co., Chicago, Ill.
Felt Cote—Metal sheets. American Steel Band Co., Pittsburgh, Pa.
Fenn's Rotary—Ventilators. Waverly Heating Supply Co., Boston, Mass.
Fenox—Compounds. Halowax Products Div., Union Carbide & Carbon Corp., New York, N. Y.
Ferrenewo—Valves. Lunkenheimer Co., Cincinnati, O.
Ferroclad—Insulation. Truscon Steel Company, Youngstown, O.
Ferrodex—Compounds. MacDermid Chemical Co., Bristol, Conn.
Ferro-Therm—Insulation. American Flange & Mfg. Co., New York, N. Y.
Ferroweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Fiberglas—Insulation. Owens-Corning Fiberglas Corp., Toledo, O.
Fiberlite—Insulation. Insulite Co., Minneapolis, Minn.
Fibron—Plastic tubing. Irvington Varnish & Insulator Co., Irvington, N. J.
Filmflo—Deaerators. Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Filterpure—Cooling surface, unit coolers. Betz Corp., Hammond, Ind.
Fil-Thru—Gages. Applied Mechanics Co., Boston, Mass.
Filt-R-Stil—Water treatment. American Cyanamid & Chemical Corp., New York, N. Y.
Filter Watchman—Air filter gages. Research Products Corp., Madison, Wis.
Finco—Finned tubing. Fintube Coil Corp., Alhambra, Calif.
Findlay—Stokers. Central Rubber & Steel Corp., Findlay, O.
Fine-Screen—Strainers. Yarnall-Waring Co., Philadelphia, Pa.
Fin-Fans—Oil coolers. Fluor Corp., Ltd., The, Los Angeles, Calif.
Fin-Flex—Registers. Auer Register Co., Cleveland, O.
Finfold—Cooling surface. Pleasantaire Corp., Washington, D. C.
Finmaster—Radiation. Smith Co., Inc., H. B., The, Westfield, Mass.
Finnflex—Bases and pads, absorbers. Finn & Co., New York, N. Y.
Finstrip—Heaters Wiegand Co., Edwin L., Pittsburgh, Pa.
Firecrete—Refractories. Johns-Manville, New York, N. Y.
Firefoil—Insulating panel. Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Fire-Hearth—Refractories. Fireline Stove & Furnace Lining Co., Chicago, Ill.
Fireite—Furnace cement; refractories. Johns-Manville, New York, N. Y.
Fireset—Refractories. Walsh Refractories Corp., St. Louis, Mo.
Fire Tender—Stokers. Holcomb & Hoke Mfg. Co., Inc., Indianapolis, Ind.
Fireye—Flame failure controls, systems. Combustion Control Corp., Cambridge, Mass.
Firma—Ventilators. Hirschman-Pohle Co., Inc., LeRoy, N. Y.
Firomatic—Filters, gages, links, switches, valves. Morse-Smith-Morse, Inc., Watertown, Mass.
Flame Buster—Spray nozzles. Grinnell Co., Inc., Providence, R. I.
Flame-otrol—Controls. Wheelco Instruments Co., Chicago, Ill.
Flange-Jacks—Separators. Williams & Co., J. H., Buffalo, N. Y.
Flaremaster—Benders. Everhot Products Co., Chicago, Ill.
Flash-Off—Welding compounds. Acme White Lead & Color Wks., Detroit, Mich.
Flat-Belt—Pulleys and sheaves. The American Pulley Co., Philadelphia, Pa.
Flatjet—Spray nozzles. Spraying Systems Co., Bellwood, Ill.
Fleetweld—Welding electrodes. Lincoln Electric Co., Cleveland, O.
Fleetwelder—Welders. Lincoln Electric Co., Cleveland, O.
Fleet-X—Enamels and lacquers. Acme White Lead & Color Works, Detroit, Mich.
Flexarc—Arc welders. Westinghouse Electric Corp., Pittsburgh, Pa.
Flexaust—Hose. American Ventilating Hose Co., New York, N. Y.
Flexcord—Drives. Gates Rubber Co., Denver, Col.
Flexfast—Hose clamps. Flexible Tubing Corp., Branford, Conn.
Flexiblac—Protective coatings. Samuel Cabot, Inc., Boston, Mass.
Flexidur—Nozzles. Bahnson Co., Winston-Salem, N. C.
Flexigrip—Fittings. Gustin Bacon Mfg. Co., Kansas City, Mo.
Flexiwound—Gaskets. Azor Corp., Irvington, N. J.
Flexloc—Lock nuts. Standard Pressed Steel Co., Jenkintown, Pa.
Flexodisc—Expansion joints. Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Flexpin—Couplings. Smith & Serrell, Inc., Newark, N. J.
FlexRing—Couplings. Smith & Serrell, Inc., Newark, N. J.
Flextite—Gate valves. Ohio Brass Co., Mansfield, O.
Flex-Tube — Analyzers, gages, manometers. Dwyer Mfg. Co., F. W., Chicago, Ill.
Floatrol—Switches, regulators. Automatic Control Co., St. Paul, Minn.
Flo-Controls—Fittings. W-H Engineering Co., Chicago, Ill.
Floetless—Sump pumps. Imperial Brass Mfg. Co., Chicago, Ill.
Flo-Gage—Meters. Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Flo-Klean—Filters, strainers. Cuno Engineering Corp., Meriden, Conn.
Flo-Master—Valves. W-H Engineering Co., Chicago, Ill.
Flo-scope—Meters. Selas Corp. of America, Philadelphia, Pa.
Flotrol—Humidifiers, valves. Cleveland Humidifier Co., Cleveland, O.
Flo-watch—Flow meters. Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Flowline—Pipe fittings. Welding Fittings Corp., New Castle, Pa.
Flowrator—Meters. Fischer & Porter Co., Hatboro, Pa.
Flualyzer—Analyzers. Engelhard, Inc., Chas., Newark, N. J.
Fluidyne—Pumps. Peerless Pump Div., Food Machinery and Chemical Corp., Los Angeles, Calif.
Flush-Kleen—Sewage ejectors and pumps. Chicago Pump Co., Chicago, Ill.
Flux-Stik—Solder and fluxes. Lake Chemical Co., Chicago, Ill.
Foambuster—Compounds. Cannon Chemical Co., Inc., Cambridge, Mass.
Foamglas—Insulation. Armstrong Cork Co., Lancaster, Pa.
Foamglas—Insulation. Pittsburgh Corning Corp., Pittsburgh, Pa
Foamglas—Insulation. Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Force-Flo—Circulators, fittings, heaters, regulators, tanks. Kehm Corp., The, Chicago, Ill.
Formet—Water treatment. Perolin Co., Inc., Chicago, Ill.
4-Point—Control systems. Perfex Corp., Milwaukee, Wis.
"400" Series—Heaters. Fitzgibbons Boiler Co., Inc., New York, N. Y.
Fracto-Crete—Refractories. Ramtite Co., The, Chicago, Ill
Francke—Flexible couplings. Waldron Corp., John, New Brunswick, N. J
Francke Parts—Couplings. Smith & Serrell, Inc., Newark, N. J.
Franzite—Enamels and lacquers. Hilo Varnish Corp., Brooklyn, N. Y.
Free-Aire—Air conditioning units, heaters. Kehm Corp., The, Chicago, Ill.
Free-Flow—Ventilators. Burt Mfg. Co., Akron, O.
Fre-Flo—Strainers. Fisher Governor, Marshalltown, Ia.
Fresh Air Maker—Propeller fans, units, ventilators. Schwitzer-Cummins Co., Indianapolis, Ind.
Frevent—Valves. Bridgeport Brass Co., Bridgeport, Conn.
Frictionized—Belting. Baldwin Belting, Inc., New York, N. Y
Frigid—Propeller fan blades and fans, paint spray booths, air conditioning units, ventilators. Circulators & Devices Mfg. Corp., New York, N. Y.
Frigistat—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Frigitower—Cooling towers. Thermal Industries, Indio, Calif.
Frost-Tite—Fittings. Remco, Inc., Zelienople, Pa.
Fuelguard—Commercial and industrial burners. Fuelguard Co., Dallas, Tex.
Fuel Saver—Boilers. International Boiler Works, East Stroudsburg, Pa.
Fuelsaver—Boilers. Columbia Radiator Co., McKeesport, Pa.
Fueltone—Fuel oil treatment. Ampion Corp., Long Island City, N. Y.
Fulflo—Filters. Commercial Filters Corp., Boston, Mass.
Fulljet—Spray nozzles. Spraying Systems Co., Bellwood, Ill.
Fulscope—Recorders, recorder-controllers, regulators. Taylor Instrument Companies, Rochester, N. Y.
Fuseair—Air diffusers. Aladdin Heating Corp., Oakland, Calif.
Fusomatic—Links. Preferred Utilities Mfg. Corp., New York, N. Y.
Fybr-Tech—Gaskets and sheets. Technical Ply-Woods, Chicago, Ill.
Fyr-Feeder—Stokers. American Coal Burner Co., Chicago, Ill.
Fyrite—Analyzers. Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Fyritec—Recorders. Cole-Sewell Engineering Co., St. Paul, Minn.

GB—Fans. General Blower Co., Morton Grove, Ill.
G. B. C.—Fans, gages, regulators. General Blower Co., Inc., Philadelphia, Pa.
G-E—Compressors, condensers, thermostats. General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
G-Fin—Cooling and heating surface. Griscom-Russell Co., The, New York, N. Y.
GIL—Filters, regulators. Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
GIL Governoret—Valves. Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
GIL No-Hum—Check valves. Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
G. P.—Smoke density recorders. General Power Plant Corp., New York, N. Y.
G-R—Aftercoolers, oil coolers, water chillers, regulators. Griscom-Russell Co., The, New York, N. Y.

G-R—Air conditioners. General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Gaco—Couplings. Gates Engineering Co., Wilmington, Del.
Gaco-Neoprene—Blades, coatings, fittings, housings, pipe, valves. Gates Engineering Co., Wilmington, Del.
Gaiongage—Gages. Applied Mechanics Co., Boston, Mass.
Galv-O-Zinc—Coatings. Blue Ridge Talc Co., Inc., Henry, Va.
Gasgun—Torches. Century Aircraft, Los Angeles, Calif.
Gas-A-Fire—Burners. Automatic Firing Corp., St. Louis, Mo.
Gast—Filters, separators. Johnson Corp., The, Three Rivers, Mich.
Gasteam—Radiators. Clow & Sons, James B., Chicago, Ill.
Gasweld—Torches, welding rod and apparatus. Liquid Carbonic Corp., The, Chicago, Ill.
Geddes—Radiation. Fowler & Wolte Radiator Co., Norristown, Pa.
Gehl—Stokers. Eddy Stoker Corp., Chicago, Ill.
Gemaco—Compressors. General Machinery Co., Spokane, Wash.
Gemco—Bolts, clamps, hangers and supports, fasteners. Goodloe E. Moore, Inc., Danville, Ill.
Gemco—Air conditioning units. General Engineering & Mfg. Co., St. Louis, Mo.
Gemware—Hygrometers, psychrometers, thermometers, G. M. Mfg. Co., New York, N. Y.
Genuine Stillson—Wrenches. Walworth Co., New York, N. Y.
Gerotor—Rotary pumps. May Oil Burner Div., Gerotor May Corp., Baltimore, Md.
Giant—Radiation. John J. Nesbitt, Inc., Philadelphia, Pa.
Giant—Radiator hangers. Western Hanger Co., San Francisco, Calif.
Gilbarco—Compressors, oil burners, heaters. Gilbert & Barker Mfg. Co., West Springfield, Mass.
Gilsonite—Protective coatings. Uhmlac Paint & Refining Co., Inc., New York, N. Y.
Gilt Edge—Belting. Rhoads & Sons, J. E., Philadelphia, Pa.
Gland-Pakt—Expansion joints. Yarnall-Waring Co., Philadelphia, Pa.
Glasfab—Insulation wrapping. Lexington Supply Co., The, Cleveland, O.
Globe—Clamps, plates, hangers and supports. Hupp Corp., Globe Stamping Div., Cleveland, O.
Glo-Tech—Glass pipe. Fischer & Porter Co., Hatboro, Pa.
Glowan—Gas burners. Martin Co., Inc., J. O., San Francisco, Calif.
Gloweld—Welded steel tubing. Globe Steel Tubes Co., Milwaukee, Wis.
Glucosates—Compounds, steam system treatment. Haering & Co., Inc., D. W., Chicago, Ill.
Gohi—Sheets. Newport Rolling Mill Co., Newport, Ky.
Gold Bond—Insulation. National Gypsum Co., Buffalo, N. Y.
Goodyearite—Packing. Goodyear Tire & Rubber Co., Akron, O.
Grad-U-Motor—Damper operators. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Gradustat—Regulators, thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Gradutrol—Diaphragm valves, radiator orifices. Minneapolis-Honeywell Regulator Co., Minneoplis, Minn.
Grand Rapids—Boiler vacuum cleaners. Doyle Vacuum Cleaner Co., Grand Rapids, Mich.
Granodine—Protective coatings. American Chemical Paint Co., Ambler, Pa.
Graylite—Insulation. Insulite Co., Minneapolis, Minn.
Greastop—Air filters. Air-Maze Corp., Cleveland, O.
Grid—Cooling and heating surface condensers, radiation, unit heaters. Murray Mfg. Co., D. J., Wausau, Wis.
Gripzins—Expansion bolts. Star Expansion Bolt Co., New York, N. Y.
Gritseald—Rotary pumps. St. Louis Tool Co., St. Louis, Mo.
Gruvagrip—Couplings. Gustin Bacon Mfg. Co., Kansas City, Mo.
Guardian—Gaskets. Garlock Packing Co., Palmyra, N. Y.
Gunchrome—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.
Gunmix—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.
GunPakt—Expansion joints. Yarnall-Waring Co., Philadelphia, Pa.
Guthfan—Fans. Guth Co., Edwin F., St. Louis, Mo.
Gyrol Fluid Drive—Speed changer. American Blower Corp., Detroit, Mich.

H & C—Grilles, registers. Hart & Cooley Mfg. Co., Holland, Mich.
H-O-H—Compounds, feeders, steam system and water treatment. Haering & Co., Inc., D. W., Chicago, Ill.
HS—Fans. American Blower Corp., Detroit, Mich.
Hammerkraft—Enamels and lacquers. Hilo Varnish Corp., Brooklyn, N. Y.
Hammermill—Belting. Goodyear Tire & Rubber Co., Akron, O.
Hammer-on—Regulators. Air Control Products, Inc., Coopersville, Mich.
Hammer-Set—Bolts. Rawlplug Co., Inc., The, New York, N. Y.
Hancock—Valves. Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Handy—Benders. Holsclaw Bros., Inc., Evansville, Ind.
Handy—Ducts and duct fittings. Meyer & Bro. Co., F., Peoria, Ill.
Handy Andy—Vise stands. Western Wire Products Co., St. Louis, Mo.
Hardweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Hartmann—Heaters. Montgomery Bros., San Francisco, Calif.
Hazleton—Pumps, strainers, valves. Barrett, Haentjens & Co., Hazleton, Pa.
Heacon—Dampers. Thermix Corp., The, Greenwich, Conn.
Heath-Crete—Refractories. Quigley Co., Inc., New York, N. Y.
Heart-Oak—Belting. Graton & Knight Co., Worcester, Mass.
Heat-aid—Refractories. Pyrolite Products Co., Cleveland, O.
Heat Extractor—Boilers. National Radiator Co., The, Johnstown, Pa.
Heatomat—Boilers. Richmond Radiator Co., New York, N. Y.
Heat-O-Meter—Temperature regulators, thermostats. Miller-Harris Instrument Co., Milwaukee, Wis.
Heat-Pak—Boilers, heaters. Aldrich Co., The, Wyoming, Ill.
Heat-Rite—Registers. Auer Register Co., Cleveland, O.
Heatsum—Conductors. Roberson Co., L. N., Seattle, Wash.
Heat-Tite—Insulating cement. Ramtite Co., The, Chicago, Ill.
Heat-Valve—Ventilators. Swartwout Co., Cleveland, O.
Heat-X—Heat exchangers, condensers. Heat-X-Changer Co., Inc., The, Brewster, N. Y.
Heliarc—Welders. Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Helical—Tubing. Rome-Turney Radiator Co., Rome, N. Y.
Heliflow—Aftercoolers, chillers, oil coolers, heat exchangers, water heaters. Graham Mfg. Co., Inc., New York, N. Y.
Hellite — Refractories. Johns-Manville, New York, N. Y.
Herco—Arc welders. Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
Herculoy—Tubing. Revere Copper and Brass, Inc., New York, N. Y.
Herecrol—Protective Coatings. Heresite & Chemical Co., Manitowoc, Wis.
Hi-Cap—Furnaces. Syncromatic Corp., Watertown, Wis.
Hi-Duty—Combustion chambers. Monogram Products Co., Philadelphia, Pa.
Hi-Fin—Surfaces, tubing. Doyle & Roth Mfg. Co., Brooklyn, N. Y.
Highflex—Belting. Goodrich Co., B. F., Akron, O.
High-Ten-500—Solder. Industrial Service Laboratories, Milwaukee, Wis.
High Test—Water heaters. Burnam Corp., Boiler Div., Irvington, N. Y.
Hi-Gloss—Steel sheets. Jessop Steel Co., Washington, Pa.
Hilger—Chillers, refrigerating compressors, unit coolers, unit air conditioners, valves. XL Refrigerating Co., Inc., Chicago, Ill.
Hi-Lift—Pumps. Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Hi-Lo—Alarms. Yarnall-Waring Co., Philadelphia, Pa.
Hi-Lo—Pumps. Yeomans Bros. Co., Chicago, Ill.
Hi-Lo-Graph—Recorders. Yarnall-Waring Co., Philadelphia, Pa.
Hirae—Electric heating conductors. Crittall Radiant Heating, Inc., Richard, New York, N. Y.
Hi-Seal—Cement and compounds. Greene, Tweed & Co., North Wales, Pa.
Hi-Speed—Welding and cutting apparatus. Dockson Corp., Detroit, Mich.
Hi-Spra—Spray nozzles. Thermal Industries, Indio, Calif.
Hitchings—Boilers. Burnham Corp., Boiler Div., Irvington, N. Y.
Hi-Temp—Insulation. Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Hi-Test—Boilers. Kewanee Boiler Co., Kewanee, Ill.
Hoffman—Water heaters. Clayton & Lambert Mfg. Co., Louisville, Ky.
Holdtite—Solder. American Brass Co., Waterbury, Conn.
Holgun—Drills. Black & Decker Mfg. Co., Towson, Md.
Holgun—Drills. Van Dorn Electric Tool Co., Towson, Md.
Hollo-Tech—Doors and panels. Technical Ply-Woods, Chicago, Ill.
Holt—Strainers, tube cleaners. Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Holtite—Clamps. Yarnall-Waring Co., Philadelphia, Pa.
Honeycomb—Filters. Wilson & Co., Inc., Chicago, Ill.
Horton—Tanks. Chicago Bridge & Iron Co., Chicago, Ill.
Hot Shot—Pumps. Yeomans Bros. Co., Chicago, Ill.
Hot Spot—Preheaters. Rempe Co., Chicago, Ill.
Hot Spot—Spot welders. Acme Electric Welder Co., Los Angeles, Calif.
Hovalco—Valves. Homestead Valve Mfg. Co., Coraopolis, Pa.
Huber—Stokers. Flynn & Emrich Co., Baltimore, Md.
Humiclean—Cleaning compounds, water treatment. Carolina Aniline & Extract Co., Charlotte, N. C.
Humidair—Humidifiers. Skilbeck Mfg. Co., Kenosha, Wis.
Humidigraph—Humidity recorders. Bristol Co., Waterbury, Conn.
Humidiguide—Hygrometers. Taylor Instrument Companies, Rochester, N. Y.
Humidostat—Humidistats. Johnson Service Co., Milwaukee, Wis.
Humiduct—Unit air conditioners. Bahnson Co., Winston-Salem, N. C.
Humid-U-Stat—Humidistats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Humi-Temps—Unit air coolers. Larkin Coils, Atlanta, Ga.
Humphrey—Heaters. General Gas Light Co., Kalamazoo, Mich.
Hurricane—Heaters. Zink Co., John, Tulsa, Okla.
Hurrivent—Valves. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Hydralt—Protective coatings. Flintkote Co., The, New York, N. Y.
Hydramotor—Valves. General Controls Co., Glendale, Calif.
Hydro—Recorders. Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Hydro-Clone—Dust collectors, welding fume exhausters. Whiting Corp., Harvey, Ill.
Hydro-Flo—Heaters, heating systems, circulators, regulators. Bell & Gossett Co., Morton Grove, Ill.
Hydro-Foil—Pumps. Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Hydro-Matic—Connectors. Mechanical Products Corp., Chicago, Ill.
Hydron—Bellows. Clifford Mfg. Co., Div. of Standard-Thomson Corp., Waltham, Mass.
Hydro-Sheave—Hydraulic coupling changers. Twin Disc Clutch Co., Rockford, Ill.
Hydro Therm—Heaters, heating systems. Hook & Ackerman, Inc., New York, N. Y.
Hydro-Whirl—Dust collectors, spray booths. Peters-Dalton, Inc., Detroit, Mich.
Hydryer—Dehumidifiers. Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Hy-Duty—Blower wheels, fans. Schwitzer-Cummins Co., Indianapolis, Ind.
Hy-Power—Shears and snips. Wiss & Sons Co., J., Newark, N. J.
Hyrate—Refractories. Plibrico Jointless Firebrick Co., Chicago, Ill.
Hy-Speed—Pipe vises. Munton Mfg. Co., Franklin Park, Ill.
Hytemp—Insulation. Armstrong Cork Co., Lancaster, Pa.
Hy-Temp—Cement, insulation. Keasbey & Mattison Co., Ambler, Pa.
Hytempite—Cement, refractories. Quigley Co., Inc., New York, N. Y.
Hy-Test—Water heaters, Smith Co, Inc., H. B., The, Westfield, Mass.

IMO—Pumps. De Laval Steam Turbine Co., Trenton, N. J.
I-R—Ingersoll-Rand, New York, N. Y.
IVCO—Ventilators. Iona Ventilator Co., Inc., Philadelphia, Pa.
Icy-Flo—Accumulators. McQuay, Inc., Minneapolis, Minn.
Ideal—Blowers. Perfection Grate & Stoker Co., Springfield, Mass.
Ideal—Speed changers, pulleys and sheaves. Lovejoy Flexible Coupling Co., Chicago, Ill.
Ideal—Traps. Nason Co., Detroit, Mich.
Immersatherm—Thermostats. Mercoid Corp., The, Chicago, Ill.
Impact—Nozzles. Phillips Cooling Tower Co., Inc., New York, N. Y.
Imperial—Air conditioning units. International Metal Products Co., Phoenix, Ariz.
Impulse—Traps. Yarnall-Waring Co., Philadelphia, Pa.
Inco—Electrodes, pipe fittings, pipe, rod, sheets, tubing. International Nickel Co., Inc., The, New York, N. Y.
Inconel—Pipe fittings, pipe, sheets, tubing. International Nickel Co., Inc., The, New York, N. Y.
Inconel—Tubing. Trent Tube Mfg. Co., East Troy, Wis.
Indeeco—Heaters. Industrial Engineering & Equipment Co., St. Louis, Mo.
Indoor-Outdoor—Thermostats. White-Rodgers Electric Co., St. Louis, Mo.
IngAclad—Stainless clad sheets. Ingersoll Steel Div., Borg-Warner Corp., Chicago, Ill.
In-Hib-Co—Protective coatings. Haering & Co., Inc., D. W., Chicago, Ill.
Inkstop—Air filters: Air-Maze Corp., Cleveland, O.

Ins-lite—Insulation. Insulite Co., Minneapolis, Minn.
Instant—Heaters, preheaters. Johnson Corp., The, Three Rivers, Mich.
Insulag—Insulation. Quigley Co., Inc., New York, N. Y.
Insulbrix—Refractories. Quigley Co., Inc., New York, N. Y.
Insulcrete—Insulating cement, refractories. Quigley Co., Inc., New York, N. Y.
Insulfil—Insulation. Refractory & Insulation Corp., New York, N. Y.
Insulwool—Insulation. General Insulating Products Co., Brooklyn, N. Y.
Insutube—Insulation. Union Asbestos & Rubber Co., Cicero, Ill.
Integral Jet—Burners. Stout & Sons, David, St. Louis, Mo.
Intensarc—Electrodes. National Carbon Co., New York, N. Y.
Inter-Matic—Time switches. International Register Co., Chicago, Ill.
Involute—Spray nozzles. Yarnall-Waring Co., Philadelphia, Pa.
Ionaire—Ionization apparatus. General Ozone Corp., Chicago, Ill.
Ironset—Furnace cement. Fireline Stove & Furnace Lining Co., Chicago, Ill.
Ironweld—Compounds. Sight Feed Generator Co., West Alexandria, O.
Irv-o-lite—Plastic tubing. Irvington Varnish and Insulator Co., Irvington, N. J.
Isomodes—Bases and pads, vibration isolating. M. B. Mfg Co., The, New Haven, Conn.

J & C—Burners, fans, furnaces, heaters. Jackson & Church Co., Saginaw, Mich.
J F S—Speed changers. Stephens-Adamson Mfg. Co., Aurora, Ill.
J-M—Gaskets, bases and pads, cement. Johns-Manville, New York, N. Y.
J-M Ball—Floats, traps. Cryer Trap & Valve Co., Inc., New York, N. Y.
J O Line—Wrenches. J O Mfg. Co., South Gate, Calif.
Jacobus—Valves. Majot Automatic Machine Co., Inc., East Orange, N. J.
Janitrol—Boilers, burners, heaters, systems, unit air conditioners. Surface Combustion Corp., Toledo, O.
Jarco—Unions, valves. Jarecki Mfg. Co., Erie, Pa.
Jay Cee Silica Gel—Dehydrators. Joliet Chemicals, Inc., Joliet, Ill.
Ject-O-Valve—Ventilators. Swartwout Co., Cleveland, O.
Jennings—Pumps, ejectors. Nash Engineering Co., South Norwalk, Conn.
Jetal—Protective coatings. Alrose Chemical Co., Providence, R. I.
Jetcote—Protective coatings. Watson-Standard Co., Pittsburgh, Pa.
Jiffy Clips—Hangers and supports. Minerallac Electric Co., Chicago, Ill.
Jiffy—Regulators. Parker-Kalon Corp., New York, N. Y.
Joaz—Stainless steel fittings. J O Mfg. Co., South Gate, Calif.
John Crane—Cement and compounds, seals, packing. Crane Packing Co., Chicago, Ill.
Jointite—Insulation. Mundet Cork Corp., North Bergen, N. J.
Junior—Radiation. Weil-McLain Co., Michigan City, Ind.
JusRite—Ducts and duct fittings. Corbman Bros., Inc., Philadelphia, Pa.

K—Fittings. Kuhns Brothers Co., Dayton, O.
K. A. T.—Compounds and water treatment. American K.A.T. Corp., New York, N. Y.
K-B—Dampers, regulators. Kerentoff, G. L., Cincinnati, O.
K-C—Motors. Hoover Co., Kingston-Conley Div., North Plainfield, N. J.
K-Fin—Cooling and heating surface. Griscom-Russell Co. The, New York, N. Y.
K and M—Controls, strainers, traps, valves. Kieley & Mueller, Inc., North Bergen, N. J.
K-Master—Filters, traps, valves. Kaye & MacDonald, Inc., West Orange, N. J.
K-Shield—Boiler and pipe insulation. Robinson Industries, Coleman, Mich.
K-S-V—Ventilators. Kernchen Co., Chicago, Ill.
Kable Kord—Belting. Gilmer Co., L. H., Div. of United States Rubber Co., Philadelphia, Pa.
Kane—Boilers. Mears-Kane-Ofeldt, Inc., Philadelphia, Pa.
Karbate—Carbon pipe, heat exchangers, pumps. National Carbon Co., New York, N. Y.
Kasson—Motors. General Die and Stamping Co., New York, N. Y.
Kathabar—Dehumidifiers, humidifiers, unit air conditioners. Surface Combustion Corp., Toledo, O.
Kek—Compounds, steam and water treatments. Kenite Laboratory, Inc., Madison, N. J.
Keldur—Bases and pads. Hobsite Products Co., Paterson, N. J.
Kemtex—Water softener. MacDermid Chemical Co., Bristol, Conn.
Kenbric—Soot destroyers. Kenite Laboratory, Inc., Madison, N. J.
Kentucky—Sheets. Newport Rolling Mill Co., Newport, Ky.
Keystone—Gas fired heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Key-Tite—Cement and compounds. Key Co., East St. Louis, Ill.
Kidskin—Packing. Darcoid Co., Inc., New York, N. Y.
Kil-Mos—Water treatment. Chemical Engineering Co., Dallas, Tex.
Kimsul—Insulation. Kimberly-Clark Corp., Neenah, Wis.
King-clip—Valves. Lunkenheimer Co., Cincinnati, O.
King Leak-Pruf—Gages. Oil Equipment Mfg. Corp., New Haven, Conn.
Kleen Air—Air filters. Kaye & MacDonald, Inc., West Orange, N. J.
Kleenflo—Unit air filters. Air-Maze Corp., Cleveland, O.
Kleen Tube—Heaters. Vapor Heating Corp., Chicago, Ill.
Klingtite—Belting. Goodyear Tire & Rubber Co., Akron, O.
Klixon—Temperature control valves, motor controllers. Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass.
Klondike—Arc welders. Fern, Ralph, Scranton, Pa.
Klosd—Motors. Sterling Electric Motors, Inc., Los Angeles, Calif.
Knight-Ware—Pipe, prefabricated ducts, valves, ventilators. Knight, Maurice A., Akron, O.
Knock-Out—Arc welders, torches, drills. Lee Co., K. O., Aberdeen, S. D.
Kno-Draft—Air diffusers. Connor Engineering Corp., W. B., New York, N. Y.
Kold Board—Insulation. Baldwin-Hill Co., Trenton, N. J.
Kontrol Master—Air valves. Kieley & Mueller, Inc., North Bergen, N. J.
Kontrol Motor—Diaphragm valves. Kieley & Mueller, Inc., North Bergen, N. J.
Kooler-Aire—Commercial air conditioners. United States Air Conditioning Corp., Minneapolis, Minn.
Kool Master—Propeller fans. Air Equipment Co., Chicago, Ill.
Kool-Shade—Solar heat resisting screens. Ingersoll Steel Div., Borg-Warner Corp., Chicago, Ill.
Korector—Draft controls. Cole-Sewell Engineering Co., St. Paul, Minn.
Korolac—Protective coatings. Goodrich Co., B. F., Akron, O.
Koroseal—Plastic tubing, protective coatings. Goodrich Co., B. F., Akron, O.
Koven—Heaters. Waterfilm Boilers, Inc., Jersey City, N. J.
Kromatrol—Colorimeters. Will Corp., Rochester, N. Y.
Krome Kote—Coatings. Wolfe-Kote Co., Inc., Sheboygan, Wis.
Kwikflux—Solder. Special Chemicals Corp., New York, N. Y.
Kwik-way—Regulators. Hart & Cooley Mfg. Co., Holland, Mich.
Kyram—Refractories and refractory cement. Quigley Co., Inc., New York, N. Y.

L. A.—Motors. The Louis Allis Co., Milwaukee, Wis.
L&N—Regulators. Leeds & Northrup Co., Philadelphia, Pa.
L-R—Couplings. Lovejoy Flexible Couplings Co., Chicago, Ill.
L. R. D.—Valves. Grinnell Co., Inc., Providence, R. I.
Lamneck—Ducts and duct fittings. Clayton & Lambert Mfg. Co., Louisville, Ky.
Lawson—Wrenches. USHCO Mfg. Co., Inc., Buffalo, N. Y.
L-Blow—Fans, ventilators. Trade-Wind Motorfans, Inc., Los Angeles, Calif.
Leader—Stocks and dies. Oster Mfg. Co., Cleveland, O.
Leaflex—Enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Lectro-Clad—Protective coatings. Bart Mfg. Co., Inc., Belleville, N. J.
Lectrodryer—Dehumidifiers. Pittsburgh Lectrodryer Corp., Pittsburgh, Pa.
Ledaloyl—Sleeve bearings. Johnson Bronze Co., New Castle, Pa.
Leeds—Switches. Walton Co., Hartford, Conn.
Leigh—Roof ventilators. Air Control Products, Inc., Coopersville, Mich.
Lektro-Kleen—Air cleaners. Lennox Furnace Co., Marshalltown, Ia., Syracuse, N. Y. & Columbus, O.
Letheray—Sterilizing lamps. Hanovia Chemical & Mfg. Co., Newark, N. J.
Levalarm—Alarms. Reliance Gauge Column Co., Cleveland, O.
Levelimeter—Indicators, recorders, regulators, switches. Fischer & Porter Co., Hatboro, Pa.
Levelometer—Gages, recorders. Liquidometer Corp., Long Island City, N. Y.
Lever-Seald—Valves. Homestead Valve Mfg. Co., Coraopolis, Pa.
Level-Temp—Thermostats. White-Rodgers Electric Co., St. Louis, Mo.
Level-Trol—Regulators. Fisher Governor Co., Marshalltown, Ia.
Lexsuco—Insulation Fasteners. Lexington Supply Co., Cleveland, O.
Liberty—Packing. Johns-Manville, New York, N. Y.
Liberty—Ventilators, caps. Penn Ventilating Co., Philadelphia, Pa.
Life Line—Electric motors. Westinghouse Electric Corp., Pittsburgh, Pa.
Light Duty—Pulleys. Gates Rubber Co., The, Denver, Colo.
Lightening Hole—Punches. M-M-A, Inc., Lancaster, Pa.
Lightning—Cleaning compounds. Western Chemical Co., Kansas City, Mo.
Lightweight Champ—Pipe benders. Electric Cord Co., New York, N. Y.
Lightweld—Electrodes. Lincoln Electric Co., The, Cleveland, O.
Lima—Stokers. Carnes, Inc., John R., Lima, O.
Limit-Load—Centrifugal fans. Buffalo Forge Co., Buffalo, N. Y.
Limitorque—Valves. Philadelphia Gear Works, Inc., Philadelphia, Pa.
Limpet—Insulation. Keasbey & Mattison Co., Ambler, Pa.
Lincwelder—Welders. Lincoln Electric Co., The, Cleveland, O.
Line—Electric motors, speed reducers. Brown-Brockmeyer Co., Inc., Dayton, O.
Lineflow—Fans. American Blower Corp., Detroit, Mich.
Line-o-flo—Air diffusers, grilles. Barber-Colman Co., Rockford, Ill.
Link-Grip—Pipe wrenches. American Machine Wks., Inc., Racine, Wis.
Lin-X—Enamels and lacquers. Acme White Lead & Color Works, Detroit, Mich.
Lincolnwelder—Arc welders. Lincoln Electric Co., The, Cleveland, O.
Lipco—Cement lined fittings and pipe. Cement Lined Pipe Co., Lynn, Mass.
Lipman—Unit coolers, air conditioners, condensers, cooling surface, water chillers. General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Liqui-Jector—Dehumidifiers, dehydrants, dehydrators. Selas Corp. of America, Philadelphia, Pa.
Liquivator—Steam traps. Morehead Mfg. Co., Detroit, Mich.
Liquon—Filters, water softeners, water treatment. Liquid Conditioning Corp., Philadelphia, Pa.
Lite-Cast—Combustion chambers. Monogram Products Co., Philadelphia, Pa.
Lithcote—Coatings. Lithgow Corp., Chicago, Ill.
Little Blacksmith—Punches, shears. Kidder Mfg. Co., Inc., J. F., Burlington, Vt.
Little Giant—Sump pumps. Chicago Pump Co., Chicago, Ill.
Little Giant—Stocks and dies. Greenfield Tap & Die Corp., Greenfield, Mass.
Little Giant—Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.
Livermont—Wrenches. Richmont, Inc., Los Angeles, Calif.
Lloyd—Solder and fluxes. Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
Lo-Blast—Burners. Mid-Continent Metal Products Co., Chicago, Ill.
Lo-Fin—Surfaces, tubing. Doyle & Roth Mfg. Co., Brooklyn, N. Y.
Lockaire—Insulation. Plastergon Wall Board Co., Buffalo, N. Y.
Lockseam—Pipe. Naylor Pipe Co., Chicago, Ill.
Locktite—Regulators, dampers. Ohio Products Co., Cleveland, O.
Lodi—Boilers. Super Mold Corp., Lodi, Calif.
Lok-Joint—Insulation. Insulite Co., Minneapolis, Minn.
Lolag—Heaters. American Instrument Co., Silver Spring, Md.
Longrip—Pipe extractors. Ridge Tool Co., Elyria, O.
Lookout Heggie-Simplex—Boilers, heaters. Lookout Boiler & Mfg. Co., Chattanooga, Tenn.
Lord Burnham—Boilers. Burnham Corp., Boiler Div., Irvington. N. Y.
Lo-Set—Stokers. Canton Stoker Corp., Canton, O.
Louvre—Louvers and shutters. Kelvin-White Co., Boston, Mass.
Lowcost—Boilers. Murray Iron Works Co., Burlington, Ia.
Loxin—Bolts. Star Expansion Bolt Co., New York, N. Y.
Lyonore Metal—Sheets. Lyon, Conklin & Co., Inc., Baltimore, Md.

M. E.—Motors. Marathon Electric Mfg. Corp., Wausau, Wis.
M. & E.—Cooling surface, tubing, unit coolers, unit heaters. Merchant & Evans Co., Philadelphia, Pa.
M & F—Rubber base enamel. American-Marietta Co., Chicago, Ill.
M & H—Sheets. Matthiessen & Hegeler Zinc Co., La Salle, Ill.
MIF—Couplings, fittings. Malleable Iron Fittings Co., Branford, Conn.
MKO—Pumps. Mears-Kane-Ofeldt, Inc., Philadelphia, Pa.
M & M—Alarms, cut-offs, feeders, humidifiers, indicators, operators, pumps, regulators, switches, valves. McDonnell & Miller, Inc., Chicago, Ill.
M-R-C—Ball bearings. Marlin-Rockwell Corp., Jamestown, N. Y.
M-Scope—Pipe locators, leak detectors. Fisher Research Laboratory, Inc., Palo Alto, Calif.
M & T—Welders. Metal & Thermit Corp., New York, N. Y.
M/W and A/C Airmat—Air filters. American Air Filter Co., Inc., Louisville, Ky.
Macheta—Fans, fan blades, ventilators. Aerovent Fan Co., Inc., Piqua, O.

Magic—Cement and compounds. Blue Ridge Talc Co., Inc., Henry, Va.
Magic-Aire—Unit heaters, air conditioning units. United Electric Service Co., Wichita Falls, Tex.
Magic Dial—Pre-assembled control systems. Midwest Automatic Control Co., Des Moines, Ia.
Magic Eye Door—Door controls. Stanley Works, The, New Britain, Conn.
Magic-Grip—Sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Magic Wire—Control systems wire. Midwest Automatic Control Co., Des Moines, Ia.
Magnefer—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.
Magnehelic—Portable analyzers. Dwyer Mfg. Co., F. W., Chicago, Ill.
Magnetrol—Alarms, boiler cut-offs, switches. Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
Make-up Air—Air conditioning units. New York Blower Co., Chicago, Ill.
Manganend—Electrodes. Arcos Corp., Philadelphia, Pa.
Manganweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Manotox—Coatings. X-Pando Corp., Long Island City, N. Y.
Manu-Rod—Pipe cleaning machines. Spartan Tool Co., Chicago, Ill.
Mark Time—Time switches. Rhodes, Inc., M. H., Hartford, Conn.
Marocol—Compounds. O'Brien Industries, Jersey City, N. J.
Marvair—Air conditioning units. Muncie Gear Works, Muncie, Ind.
Marvelous—Gas fired heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Marvelwite—Enamels and lacquers. Sonneborn Sons, Inc., L., New York, N. Y.
Masco—Combustion chambers. Munn & Steele, Inc., Newark, N. J.
Mascote—Insulation. Munn & Steele, Inc., Newark, N. J.
Massachusetts—Fans, unit heaters, blower wheels, air washers, housings. Bishop & Babcock Mfg. Co., Cleveland, O.
Master—Fittings. Mel Products Co., The, New Haven, Conn.
Master—Stokers. Muncie Gear Wks., Inc., Muncie, Ind.
Master—Speed changers, controls, thermostats, regulators, switches. White Mfg. Co., St. Paul, Minn.
Master—Unions. Jefferson Union Co., Inc., New York, N. Y.
Master—Water heaters. Kehm Corp., The, Chicago, Ill.
Master Kraft—Oil burners. Harvey-Whipple, Inc., Springfield, Mass.
Maximon—Gages. J. E. Lonergan Co., Philadelphia, Pa.
Maxsteam—Boilers. Martin Co., Inc., J. O., San Francisco, Calif.
McDaniel—Floats, traps. Watson & McDaniel Co., Philadelphia, Pa.
McKee—Boilers, burners, feeders, pumps, regulators, tanks, torches, valves. Eclipse Fuel Engineering Co., Rockford, Ill.
McKeesport—Radiation. Columbia Radiator Co., McKeesport, Pa.
McKnight—Registers. Tuttle & Bailey, Inc., New Britain, Conn.
Measurrench—Wrenches. Williams & Co., J. H., Buffalo, N. Y.
Meco—Torches, gages, regulators, valves, welding rod. Modern Engineering Co., St. Louis, Mo.
Medrae—Electric heating conductors. Crittall Radiant Heating, Inc., Richard, New York, N. Y.
Melloblu—Gas burners. Beck Engineering Combustion Kompany, St. Louis, Mo.
Mel-Rock—Humidifiers, units, ventilators, washers. Mellish & Murray Co., Chicago, Ill.
Merrill Process—Heating systems. Parks-Cramer Co., Fitchburg, Mass.
Metal-Master—Shears. Wiss & Sons Co., J., Newark, N. J.
Metalflo—Tubes and tubing. H & H Tube & Mfg. Co., Detroit, Mich.
Metalhide—Protective coatings. Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Metalite—Enamels and lacquers. Atlas Powder Co., North Chicago, Ill.
Metalprep—Compounds. Nielson Chemical Co., Detroit, Mich.
Metaphram—Valves. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Metco—Ducts and duct fittings. Sheet Metal Mfg. Co., Inc., Brooklyn, N. Y.
Metermax—Thermometers. Leeds & Northrup Co., Philadelphia, Pa.
Met-L-Flex—Bases and pads. Robinson Aviation, Inc., Vibrashock Div., Teterboro, N. J.
Metl-Tech—Doors and panels, metal sheets. Technical Ply-Woods, Chicago, Ill.
Metric—Meters. American Meter Co. Inc., New York, N. Y.
Metrotherm—Thermostats. General Controls Co., Glendale, Calif.
Micafil—Insulation. Munn and Steele, Inc., Newark, N. J.
Mico—Insulation. Mineral Insulation Co., Chicago Ridge, Ill.
Micro—Low water cut-offs. Maid-O'-Mist, Inc., Chicago, Ill.
Micro-Feed—Humidifiers. Cleveland Humidifier Co., Cleveland, O.
Micro-Klean—Filters. Cuno Engineering Corp., Meriden, Conn.
Micromax—Recorders, recorder-controllers, smoke alarms, thermometers. Leeds & Northrup Co., Philadelphia, Pa.
Micromet—Water treatment. Calgon Inc., Pittsburgh, Pa.
Micromotors—Motors. Redmond Co., Inc., Owosso, Mich.
Micro-Netic—Feeders. Campbell Co., J. A., Long Beach, Calif.
MicroRold — Sheets. Washington Steel Corp., Washington, Pa.
Microtherm—Thermostats. Barber-Colman Co., Rockford, Ill.
Microvac—Pumps. Stokes Machine Co., F. J., Philadelphia, Pa.
Micro-Weld—Spot welders. Micro Products Co., Chicago, Ill.
Midget—Radiation. Utica Radiator Corp., Utica, N. Y.
Midget Powerhouse—Unit heaters. Century Engineering Corp., Cedar Rapids, Ia.
Mighty Mite—Thermostats. Mechanical Industries Production Co., Akron, O.
Milcor—Doors and panels. Inland Steel Products Co., Milwaukee, Wis.
Milford—Tools. Thompson & Son Co., The Henry G., New Haven, Conn.
Mills—Boilers. Smith Co., Inc., H. B., The, Westfield, Mass.
Milvaco—Air eliminators, floats, strainers, traps, valves, Milwaukee Valve Co., Milwaukee, Wis.
Minneapolis—Compressors. North Penn Co., New York, N. Y.
Miracle Red—Coatings. Debevoise Co., The, Brooklyn, N. Y.
Miracula—Air conditioning units. General Engineering & Mfg. Co., St. Louis, Mo.
Mir-O-Meter—Combustion control systems. Bowser, Inc., Fort Wayne, Ind.
Mixend—Arc welding electrodes. Arcos Corp., Philadelphia, Pa.
MKayO—Boilers. Mears-Kane-Ofeldt Inc., Philadelphia, Pa.
Moderator—Heating System. Warren Webster Co., Camden, N. J.
ModernAire—Fans, unit air conditioners. National Gas Equipment Co., Inc., Terrell, Tex.
Moduflow—Control systems. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Modustat—Valves, Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Modutrol—Heating systems, valve and duct operators. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Modutron—Regulators. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Mogul—Packing. Johns-Manville, New York, N. Y.
Mogul—Boiler cleaning compounds and water treatment. North American Fibre Products Co., The, Cleveland, O.
Moncrief—Ducts and duct fittings. Henry Furnace Co., The, Medina, O.
Monel—Pipe fittings, pipe, sheets, tubing. International Nickel Co., Inc., The, New York N. Y.
Monend—Arc welding electrodes. Arcos Corp., Philadelphia, Pa.
Mongol—Pipe joint cement and compounds. Baer Bros., New York, N. Y.
Monmouth—Filters, humidifiers, valves. Cleveland Humidifier Co., Cleveland, O.
Mono-Block—Insulation. Baldwill-Hill Co., Trenton, N. J.
Monobolt—Chillers, oil coolers, water heaters. Graham Mfg. Co., Inc., New York, N. Y.
Mono-Cast—Pipe. American Cast Iron Pipe Co., Birmingham, Ala.
Monoflo—Hot water heating systems and fittings. Bell & Gossett Co., Morton Grove, Ill.
Mono-Line—Refractories. Quigley Co., Inc., New York, N. Y.
Monoloct—Heat exchangers. Graham Mfg. Co., Inc., New York, N. Y.
Monomotors—Motors. Redmond Co., Inc., Owosso, Mich.
Mono-Peen—Enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Monovent—Ventilators. Burt Mfg. Co., Akron, O.
Monsoon—Fans, grilles, louvers. Jamieson Mfg. Co., Dallas, Texas.
Morflex—Flexible couplings. Morse Chain Co., Detroit, Mich.
Morpholine—Steam system treatment. Carbide & Carbon Chemicals Corp., Unit of Union Carbide and Carbon Corp., New York, N. Y.
Mortairset—Refractories. Walsh Refractories Corp., St. Louis, Mo.
Mortite—Gaskets. Mortell Co., J. W., Kankakee, Ill.
Moto-Merco—Relays. Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Motopump—Pumps. Yeomans Bros. Co., Chicago, Ill.
MotoReducer—Speed reducers, Philadelphia Gear Works, Inc., Philadelphia, Pa.
Motorstoker—Stokers. Hershey Machine & Foundry Co., Motorstoker Div., Manheim, Pa.
Motosteel—Valves. Taylor Instrument Companies, Rochester, N. Y.
Mototurb—Ventilators. Uno Ventilator Co., Cliftondale, Mass.
Mountain Air—Air conditioning units. Central States Mfg. Co., Inc., Arkansas City, Kan.
Muckle-Vent—Ventilators. Muckle Mfg. Co., Owatonna, Minn.
Muffletone—Insulation. Celotex Corp., The, Chicago, Ill.
Mullitex—Refractories. Walsh Refractories Corp., St. Louis, Mo.
Mult-Au-Matic—Threading and boring machines. Bullard Co., The, Bridgeport, Conn.
Multiblade—Welding fume exhausters. General Blower Co., Morton Grove, Ill.
Multiclone—Dust collectors. Western Precipitation Corp., Los Angeles, Calif.
Multi-Duty—Air filters. American Air Filter Co., Inc., Louisville, Ky.
Multiduty—Pulleys and sheaves. Gates Rubber Co., The, Denver, Colo.
Multiplane—Vibration isolating bases. Lord Mfg. Co., Erie, Pa.
Multiport—Valves. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Multi-Seal—Bolts, repair plugs. Rolyan Metal Products, Chicago, Ill.
Multitherm—Air conditioning units. Clarage Fan Co., Kalamazoo, Mich.
Multi-V—V-belts. Goodrich Co., B. F., Akron, O.
Multivane—Fans, blowers, unit heaters. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Multi-V-Drive—Drives. Worthington Pump & Machinery Corp., Harrison, N. J.
Multi-Wash—Dust collectors. Schneible Co., Claude B., Detroit, Mich.
Murco—Aftercoolers, cooling towers, heat exchangers, unit heaters. Murray Mfg. Co., D. J., Wausau, Wis.
Murex—Welding electrodes. Metal & Thermit Corp., New York, N. Y.

NCG—Solder, torches, welding rod. National Cylinder Gas Co., Chicago, Ill.
N-M-D—Valves. Lunkenheimer Co., Cincinnati, O.
NYBCo Steelfin—Heating surface. New York Blower Co., Chicago, Ill.
Nalco—Feeders, water treatment, soot destroyers. National Aluminate Corp., Chicago, Ill.
National—Boilers, heaters. National Radiator Co., The, Johnstown, Pa.
National—Burners. Combustion Systems Div., Vapofier Corp., Chicago, Ill.
National—Fans, furnaces. MaGirl Foundry & Furnace Co., Bloomington, Ill.
National—Heaters. Mid-Continent Metal Products Co., Chicago, Ill.
National—Pumps. Austin-Mason Co., Everett, Mass.
National—Pipe, tubing. National Tube Co., United States Steel Corp., Subsidiary, Pittsburgh, Pa.
National Art—Convection radiation. National Radiator Co., The, Johnstown, Pa.
Natur Temp—Insulation. Plastergon Wall Board Co., Buffalo, N. Y.
Naturzone—Insulation. Wilson & Co., Inc., Chicago, Ill.
Navalon—Fiber packing. Johns-Manville, New York, N. Y.
Nelson—Stokers. Heating Assurance, Inc., Spokane, Wash.
Nemo—Insulating cement. Smith & Kanzler Corp., Linden, N. J.
Nesbitt—Heaters. Webster & Co., Warren, Camden, N. J.
Newarc—Welding electrodes. Electric Arc, Inc., Newark, N. J.
New Cyclone—Dust collectors. Kirk & Blum Mfg. Co., Cincinnati, O.
Niagara—Meters. Buffalo Meter Co., Buffalo, N. Y.
Nibco—Fittings, joints, valves. Northern Indiana Brass Co., Elkhart, Ind.
Nibcoloy—Fittings, pipe, stainless steel. Northern Indiana Brass Co., Elkhart, Ind.
Nickelend—Electrodes. Arcos Corp., Philadelphia, Pa.
Nickend—Electrodes. Arcos Corp., Philadelphia, Pa.
Nicloy—Pipe, tubes, tubing. Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Nicuend—Electrodes. Arcos Corp., Philadelphia, Pa.
Nite Cool—Fans. Air Equipment Co., Chicago, Ill.
No Drip—Insulation, protective coatings. J. W. Mortell Co., Kankakee, Ill.
Non-clog—Sewage ejectors and pumps. Chicago Pump Co., Chicago, Ill.
Non-clog—Pipe line strainers. Boylston Steam Specialty Co., Chicago, Ill.
Non-Clogging—Spray nozzles. Link-Belt Co., Chicago, Ill.
Non-Con-Dux—Cement, insulation. Grant Wilson, Inc., Chicago, Ill.
Non-Frost—Insulation. Keasbey & Mattison Co., Ambler, Pa.
Nonisol—Sludge prevention treatment. Alrose Chemical Co., Providence, R. I.
Non-Sweat—Insulation. Keasbey & Mattison Co., Ambler, Pa.
No-Ox-Id—Protective coatings. Dearborn Chemical Co., Chicago, Ill.
Norblo—Dust collectors, fans. Northern Blower Co., Cleveland, O.
No-Rivet—Regulators, dampers. Ohio Products Co., Cleveland, O.

Northwestern—Water heaters. Coe Mfg. Co., Painesville, O.
Northwind—Unit air coolers. Pleasantaire Corp., Washington, D. C.
Norwesco—Cement and compounds, boiler and radiator sealing compounds. Atlas Chemical Co., Marietta, O.
No-Thread—Fittings. Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
No-Vent—Pumps. Stout & Sons, David, St. Louis, Mo.
Novoid—Insulation, adhesives. Cork Import Corp., Englewood, N. J.
Nox-Odor—Odor adsorber. Tamms Industries, Inc., Chicago, Ill.
Nu-Air—Fans, window ventilator units. Meier Electric & Machine Co., Inc., Indianapolis, Ind.
Nu-Alpina—Ventilators. Inland Steel Products Co., Milwaukee, Wis.
Nu-Grip—Shears and snips. Wiss and Sons Co., J., Newark, N. J.
Nullmatic—Gages, indicators, meters, recorders. Moore Products Co., The, Philadelphia, Pa.
Nu-Notch—Mushroom ventilators. Knowles Mushroom Ventilator Co., Upper Montclair, N. J.
Nuvent—Ventilators. Aeolus Dickinson, Chicago, Ill.
Nu-Wood—Insulation. Wood Conversion Co., St. Paul, Minn.

OB—Valves. Ohio Brass Co., Mansfield, O.
O'B-Aid—Compounds. O'Brien Industries, Jersey City, N. J.
O'B-Col—Compounds. O'Brien Industries, Jersey City, N. J.
O'B Gae—Water treatment. O'Brien Industries, Jersey City, N. J.
O'B-Ox—Water treatment. O'Brien Industries, Jersey City, N. J.
OCH—Filters. American Air Filter Co., Louisville, Ky.
O.E.M.—Flue caps, combustion chambers, cement and compounds. Oil Equipment Mfg. Corp., New Haven, Conn.
Oakwood—Leather belting and v-belts. Baldwin Belting, Inc., New York, N. Y.
Oasis—Electric dehumidifiers. Ebco Mfg. Co., Columbus, O.
O'Burnit—Soot destroyers. O'Brien Industries, Jersey City, N. J.
Octopus—Welding fume exhausters. Chelsea Fan & Blower Co., Inc., Irvington, N. J.
Ofeldt—Boilers. Mears-Kane-Ofeldt, Inc., Philadelphia, Pa.
Oil-A-Fire—Burners. Automatic Firing Corp., St. Louis, Mo.
Oilbuster—Boiler cleaning compounds. Cannon Chemical Co., Inc., Cambridge, Mass.
Oilifter—Pumping and straining units. Automatic Products Co., Milwaukee, Wis.
Oil-O-Matic—Oil burners. Williams Oil-O-Matic Div., Eureka Williams Corp., Bloomington Ill.
Oilway—Oil fired heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Okay Tred—Leather belting. Houghton & Co., E. F., Philadelphia, Pa.
Ol' Faithful—Humidifiers. Maid-O'-Mist, Inc., Chicago, Ill.
One Venturi—Heating systems. Taco Heaters, Inc., Providence, R. I.
Oriflex—Valves. Dunham Co., C. A., Chicago, Ill.
Oswego—Cutters, punches, wrenches. International Nutyp Tool Co., Oswego, N. Y.
Ovaltube—Gas burners. Beck Engineering Combustion Kompany, St. Louis, Mo.
Oversize—Refrigerant dehydrators. Wabash Mfg. Co., Chicago, Ill.
Oxweld—Welding rod, welding and cutting apparatus. Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Oxycuttend—Electrodes. Arcos Corp., Philadelphia, Pa.
Ozite—Insulation. American Hair & Felt Co., Chicago, Ill.

P. B. H.—Cocks, try cocks. Paul B. Huyette Co., Inc., Philadelphia, Pa.
P-D—Pumps. Peters-Dalton, Inc., Detroit, Mich.
PD QC—Pipe machines. Bignall & Keeler Div., John Ramming Machine Co., St. Louis, Mo.
P & H—Blue print machines. Peck & Harvey, Chicago, Ill.
P & H—Welding electrodes, arc welders. Harnischfeger Corp., Milwaukee, Wis.
P. I. V. Gear—Speed changers. Link-Belt Co., Philadelphia, Pa.
Pacific—Unit heaters. Palmer Mfg. Corp., Phoenix, Ariz.
Pacific—Furnaces. Rosebraugh Co., W. W., Salem, Ore.
Pacific Coast—Refrigerant dehydrators. Wabash Mfg. Co., Chicago, Ill.
Paintgrip—Sheets. Armco Steel Corp., Middletown, O.
Paladin—Enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Palco—Packing. Greene, Tweed & Co., North Wales, Pa.
Palco Wool-Saferized—Insulation. Pacific Lumber Co., The, San Francisco, Calif.
Palmaire—Furnaces, unit heaters, humidifiers. Palmer Mfg. Corp., Phoenix, Ariz.
Palmetto—Packing, cement and compounds. Greene, Tweed & Co., North Wales, Pa.
Palmetto Superheat—Gaskets. Greene, Tweed & Co., North Wales, Pa.
Pan-L-Grid—Coils and panels. Pan-L-Heat Corp., Portland, Ore.
Par—Air and refrigerating compressors. Lynch Corp., Toledo, O.
Paracoil—Coils, condensers, heaters, oil coolers, pipe nipples, preheaters, steam traps, water chillers, aftercoolers. Davis Engineering Corp., Elizabeth, N. J.
Paraline—Motor bases. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Parasol—Spray nozzles. Spraying Systems Co., Bellwood, Ill.
Parko — Psychrometers. Parks-Cramer Co., Fitchburg, Mass.
Pathfinder—Belting. Goodyear Tire & Rubber Co., Akron, O.
Pedrifugal—Centrifugal pumps. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Peerless—Pipe machines. Bignall & Keeler Div., John Ramming Machine Co., St. Louis, Mo.
Peerless—Direct radiation. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Pelro—Asbestos packing. Greene, Tweed & Co., North Wales, Pa.
Penco—Plastic fittings, pipe. North Penn Co., New York, N. Y.
Penflex-Weld—Absorbers. Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.
Pennco—Sectional cast iron boilers. Pennsylvania Furnace & Iron Co., Warren, Pa.
Penn-M-Co—Fittings. Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
Penn-Power—Ventilators. Penn Ventilating Co., Philadelphia, Pa.
Penn-Turbine—Ventilators. Penn Ventilating Co., Philadelphia, Pa.
Perfection—Hangers and supports. Iwan Brothers, Inc., South Bend, Ind.
Perfection—Plates. Beaton & Cadwell Mfg. Co., New Britain, Conn.
Perfection—Valves. American District Steam Co., North Tonawanda, N. Y.
Perfecto—Boiler parts, cement Green Fire Brick Co., Mexico, Mo.
PeroNite—Soot destroyers. Perolin Co., Inc., Chicago, Ill.
Petco—Insulating cement, chambers. Peterson Co., B. A., Dowagiac, Mich.
Petro—Oil burners, water heaters. Petroleum Heat & Power Co., Stamford, Conn.
Pexto—Brakes, punches, shears, wrenches, machines. Peck, Stow & Wilcox Co., Southington, Conn.
Pic—Steel unions. Fairbanks Co., New York, N. Y.
Pier—Spot welders. Peer, Inc., Benton Harbor, Mich.
Pilotstat—Flame failure controls. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Pioneer—Thermostats. Crown Controls Co., Inc., New Bremen, O.
Pipe Master—Pipe cutting machines. Oster Mfg. Co., Cleveland, O.
Pipemaster—Wrenches. Erie Tool Wks., Erie, Pa.
Pipetite—Cements and compounds. Lake Chemical Co., Chicago, Ill.
Pittairaide—Air sterilizing units, Pittsburgh Chemical Laboratories, Inc., Pittsburgh, Pa.
Pittsburgh—Unit heaters. Automatic Gas Equipment Co., Pittsburgh, Pa.
Pittsburgh-National—Meters. Pittsburgh Equitable Meter Div., Rockwell Mfg. Co., Pittsburgh, Pa.
Planeweld—Electrodes. Lincoln Electric Co., The, Cleveland, O.
Plasgon—Cement and compounds. Samuel Cabot, Inc., Boston, Mass.
Plastoid—Furnace cement. Plastic Products Co., Detroit, Mich.
Platecoil—Coils. Kold-Hold Manufacturing Co., Lansing, Mich.
Playford—Stokers. Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Plexifin—Unit heaters. Bayley Blower Co., Milwaukee, Wis.
Plexiform—Fans. Bayley Blower Co., Milwaukee, Wis.
Plexiform Junior—Unit ventilators. Bayley Blower Co., Milwaukee, Wis.
Plicast—Refractories. Plibrico Jointless Firebrick Co., Chicago, Ill.
Plisulate—Insulating cement and insulation. Plibrico Jointless Firebrick Co., Chicago, Ill.
Plumber Krak-Stik—Cement and compounds. Lake Chemical Co., Chicago, Ill.
Plumrite—Pipe. Bridgeport Brass Co., Bridgeport, Conn.
Plymouth—Stokers. Clizbe Bros. Mfg. Co., Plymouth, Ind.
Ply-Tech—Plywood sheets and board. Technical Ply-Woods, Chicago, Ill.
Pneumatronic—Electronic and pneumatic temperature control equipment. Johnson Service Co., Milwaukee, Wis.
Poeco—Insulation. Poe Co., C. W., Cleveland, O.
Polartron—Relays, regulators, switches Minneapolis Honeywell Regulator Co., Minneapolis, Minn.
Polymerin—Protective coatings. Interchemical Corp., Finishes Div., Newark, N. J.
Polymeroid—Enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Polytherm—Protective coatings. Interchemical Corp., Finishes Div., Newark, N. J.
Poronze—Filters. Wabash Mfg. Co., Chicago, Ill.
Poro-Stone—Filters. Adams Co., Inc., R. P., Buffalo, N. Y.
Port-A-Pony—Portable pipe cutting machines. Ter-I-Day Sales & Engineering Co., Detroit, Mich.
Porta Drive—Pipe cutting machines. Muncie Gear Wks., Inc., Muncie, Ind.
Porto-Power—Pipe benders and pipe pushers, pumps, punches. Blackhawk Mfg. Co., Milwaukee, Wis.
Porto-Shear—Shears. Van Dorn Electric Tool Co., Towson, Md.
Porto Shears—Shears. Black & Decker Mfg. Co., Towson, Md.
Portovent—Hose. American Ventilating Hose Co., New York, N. Y.
Poweraire—Furnaces. Jackson & Church Co., Saginaw, Mich.
Powerated—Furnaces. Jackson & Church Co., Saginaw, Mich.
Power—Belting. Rhoads & Sons, J. E., Philadelphia, Pa.
Power Boy—Pipe cutting and threading machines. Oster Mfg. Co., Cleveland, O.
Powercord—Flat belt drives. Gates Rubber Co., The, Denver, Colo.
Powermaster—Boilers. Orr & Sembower, Inc., Reading, Pa.
Poweroil—Oil burners. Jackson & Church Co., Saginaw, Mich.
Power-Poise—Electric motors. Brown-Brockmeyer Co., Inc., Dayton, O.
Precipitron—Air cleaners. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Precision—Nozzles. Benjamin Air Rifle Co., St. Louis, Mo.
Premier—Welding rod. American Steel & Wire Co., United States Steel Corp. Subsidiary, Cleveland, O.
Pre-Notch—Ducts and duct fittings. Gray Metal Products, Inc., Rochester, N. Y.
Pressuregraph—Indicator-controllers, recorders. Electro Products Laboratories, Inc., Chicago, Ill.
Pressure-Link—Gages. J. E. Lonergan Co., Philadelphia, Pa.
Pressuretrol—Regulators, switches. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Prestico—Furnace cement. Presstite Engineering Co., St. Louis, Mo.
Prest-O-Lite—Leak detectors, torches. Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Presto-Lock—Couplings. Drinkwater, Inc., Waukegan, Ill.
Prest-O-Weld—Welding and cutting apparatus. Linde Air Products Co., The, New York, N. Y.
Princo—Gages, manometers, psychrometers, regulators, relays, thermometers, thermostats. Precision Thermometer and Instrument Co., Philadelphia, Pa.
Propeloflo—Meters. Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Prop-R-Temp—Air conditioning units. Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
Protectoglo—Controls. Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Protectomotor—Air filters, separators. Dollinger Corp., Rochester, N. Y.
Protector—Lamps. M-M-A, Inc., Lancaster, Pa.
Protect-O-Ray—Lamps. Lustra Corp. of America, Brooklyn, N. Y.
Protectorelay—Flame failure controls, relays. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Proxlin—Enamels and lacquers. Acme White Lead & Color Works, Detroit, Mich.
Pryzoak—Belting. Graton & Knight Co., Worcester, Mass.
Pul-Air—Ventilators. Lyon, Conklin & Co., Inc., Baltimore, Md.
Pul Air—Ventilators. Penn Ventilating Co., Philadelphia, Pa.
Pulling—Circulators, pumps. Columbus Steam Pump Works Co., Columbus, O.
Pulverzone—Stokers. American Coal Burner Co., Chicago, Ill.
Punkah—Louvers and shutters. Kelvin-White Co., Boston, Mass.
Puridryer—Dehumidifiers. Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Pur-O-Fiers—Separators. Goodyer Industries, Inc., Chicago, Ill.
Purox—Welding and cutting apparatus. Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Pyratherm—Controls. Mercoid Corp., The, Chicago, Ill.
Pyrex—Glass pipe, gage and sight glasses. Corning Glass Wks., Corning, N. Y.
Pyro—Thermometers, recorders, regulators. Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.
Pyrofax—Propane gas refrigerant. Carbide and Carbon Chemicals Corp., New York, N. Y.
Pyroflex—Coatings, lined pipes, tanks, enamels and lacquers. Knight, Maurice A., Akron, O.
Pyromaster—Regulators. Bristol Co., The, Waterbury, Conn.

Pyrotron—Recorders. Bailey Meter Co., Cleveland, O.
Pyrovisor—Controls. Bristol Co., The, Waterbury, Conn.

QD—Pulleys and sheaves. Worthington Pump & Machinery Corp., Harrison, N. J.
Q-T—Insulation. Celotex Corp., The, Chicago, Ill.
Q-Chromastic—Refractories. Quigley Co., Inc., New York, N. Y.
Q-Chrome—Refractories. Quigley Co., Inc., New York, N. Y.
Quad—Fans. Trade-Wind Motorfans, Inc., Los Angeles, Calif.
Quantrol—Vanes. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Quartzoid—Sprinkler heads. Grinnell Co., Inc., Providence, R. I.
Quick-as-Wink—Valves. C. B. Hunt & Son, Inc., Salem, O.
Quiet Zone—Fans. Palmer's Mfg. Corp., Phoenix, Ariz.
Quintair—Heat exchangers. Pritchard & Co., J. F., Kansas City, Mo.
Quintex—Heat exchangers. Pritchard & Co., J. F., Kansas City, Mo.
Quintube—Heat exchangers. Pritchard & Co., J. F., Kansas City, Mo.

RB—Couplings. Link-Belt Co., Indianapolis, Ind.
RBC—Roller bearings. Roller Bearing Co. of America, Trenton, N. J.
RB Pressure—Pressure blowers. Western Blower Co., Seattle, Wash.
R & G—Grilles. registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
R. I.—Unions. Rhode Island Fittings Co., Providence, R. I.
R-K—Combustion control systems, regulators, valves. Ruggles-Klingemann Mfg. Co., Salem, Mass.
R & M—Motors. Robbins & Myers, Inc., Springfield, O.
R-M—Packing. Raybestos-Manhattan, Inc., Passaic, N. J.
R. M. B.—Ball bearings. Landis & Gyr, Inc., New York, N. Y.
R & M Moyno—Pumps, Robbins & Myers, Inc., Springfield, O.
R-Mir-Dek—Protective coatings. Miracle Adhesives Corp., New York, N. Y.
R.P.—Air filters, water softeners, gages. Research Products Corp., Madison, Wis.
R. P. & C.—Fittings, valves. Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Bridgeport, Conn.
RTC—Valves—Gold Top Heating, Inc., Butte, Mont.
R-U-F—Fans. Reed Unit-Fans, Inc., New Orleans, La.
R-Z-U—Fire tube boilers. Fitzgibbons Boiler Co., Inc., New York, N. Y.
R-Z-U Junior—Heaters. Fitzgibbons Boiler Co., Inc., New York, N. Y.
Radiafin—Finned tubing, finned surface. Schutte & Koerting Co., Philadelphia, Pa.
Radialflow—Valves. Smolensky Valve Co., Inc., Bedford, O.
Radiant—Direct radiation. Burnham Corp., Boiler Div., Irvington, N. Y.
Radiantrol—Valves. Homestead Valve Mfg. Co., Coraopolis Pa.
Radi-Aire—Propeller fans. Reynolds Electric Co., River Grove, Ill.
Radi-Ion—Ionization apparatus. Montgomery Bros., San Francisco, Calif.
Radi-Vector—Radiation. Vulcan Radiator Co., Hartford, Conn.
Radolite—Cement, refractories. Pyrolite Products Co., Cleveland, O.
Rador—Thermostats. Vapor Heating Corp., Chicago, Ill.
Raintite—Ventilators. Aeolus Dickinson, Chicago, Ill.
Rajah—Packing. Johns-Manville, New York, N. Y.
Ramapo—Leather belting and v-belts. Baldwin Belting, Inc., New York, N. Y.
Ramset—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.
Ramset—Drills, insulation fasteners, hangers and supports. Stemco Corp., The, Rocky River, O.
Ranarex—Analyzers, indicators, recorders. Permutit Co., New York, N. Y.
Rapid—Oil coolers. Bell & Gossett Co., Morton Grove, Ill.
Rapiduction—Pipe cutting machines. Oster Mfg. Co., Cleveland, O.
Ratosight—Alarms, flow switches. Fischer & Porter Co., Hatboro, Pa.
Rawl-Anchor—Bolts. Rawlplug Co., Inc., The, New York, N. Y.
Rawldrill—Drills for masonry. Rawlplug Co., Inc., The, New York, N. Y.
Rawl-Drive—Bolts. Rawlplug Co., Inc., The, New York, N. Y.
Rawl Taper—Bolts. Rawlplug Co., Inc., The, New York, N. Y.
Raydiant—Radiation. Weil-McLain Co., Michigan City, Ind.
Rayduct—Pipe. Bethlehem Steel Co., Bethlehem, Pa.
Ready-Pack—Clamps. Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Recirculair—Unit heaters. New York Blower Co., Chicago, Ill.
Reco—Accumulators, condensers, headers, heaters, preheaters, tanks, unit coolers. Richmond Engineering Co., Richmond, Va.
Reco—Controllers and starters, motors, propeller fans, switches. Reynolds Electric Co., River Grove, Ill.
Recoid—Refrigerating evaporative condensers, coolers, cooling & heating surface, cooling towers, air conditioning units. Refrigeration Engineering, Inc., Los Angeles, Calif.
Reco-Radi-Aire—Fans. Reynolds Electric Co., Chicago, Ill.
Record-O-Stat—Recorder-controllers. Johnson Service Co., Milwaukee, Wis.
Recoy—Chillers, condensers, cooling surface, unit air conditioners and coolers. Refrigeration Economics Co., Inc., Canton, O.
Red—Compressors, controllers and starters, heaters, indicators, operators, regulators, switches, thermostats. Cooper Co., Clark, Palmyra, N. J.
Red Cap—Ventilators, Warner Ventilator Co., La Grange, Ind.
Red Devil—Furnace and pipe joint cement. Pecora Paint Co., Philadelphia, Pa.
Red Diamond—Pipe. American District Steam Co., North Tonawanda, N. Y.
Red-E-Haul—Portable machines. American Die & Tool Co., Inc., Reading, Pa.
Red Flash—Traps. Ellis Drier Co., Chicago, Ill.
Red Head—Tongs. Billings & Spencer Co., Hartford, Conn.
Red Head—Traps. Ellis Drier Co., Chicago, Ill.
Redi—Stokers. General Machinery Co., Spokane, Wash.
Redi-Return—Pumps. American-Marsh Pumps, Inc., Battle Creek, Mich.
Redi-Vac—Pumps. American-Marsh Pumps, Inc., Battle Creek, Mich.
Red Reading Mercury—Hygrometers, psychrometers, thermometers. Palmer Thermometers, Inc., Cincinnati, O.
Red Seal—Engines. Continental Motors Corp., Muskegon, Mich.
Red Socket—Wrenches. Lowell Wrench Co., Worcester, Mass.
Red Top—Humidistats, thermostats. H-B Instrument Co., Philadelphia, Pa.
Red Top—Valves. Neptune Meter Co., New York, N. Y.
Red Top—Insulation. United States Gypsum Co., Chicago, Ill.
Reformend—Electrodes. Arcos Corp., Philadelphia, Pa.
Retrak Screen—Gas burners. Selas Corp. of America, Philadelphia, Pa.
Rego—Regulators, valves, welding and cutting apparatus. National Cylinder Gas Co., Chicago, Ill.
Reiser—Valves. Homestead Valve Mfg. Co., Coraopolis, Pa.
Relatrol—Heating systems. Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Reliance—Regulators. American Meter Co., Inc., New York, N. Y.
Remote—Indicators. Yarnall-Waring Co., Philadelphia, Pa.
Renewo—Valves. Lunkenheimer Co., Cincinnati, O.
Renu-Vent—Air filters. American Air Filter Co., Inc., Louisville, Ky.
Research—Belting. Graton & Knight Co., Worcester, Mass.
Resiscote—Enamels and lacquers. Reilly Tar & Chemical Corp., Indianapolis, Ind.
Reliance—Leather belting. Chicago Belting Co., Chicago, Ill.
Resistive—Insulation. Infra Insulation, Inc., New York, N. Y.
Revolute—Blueprint machines. Paragon-Revolute Corp., Rochester, N. Y.
Revolving—Heaters. Wing Mfg. Co., L. J., New York, N. Y.
Revolving—Ventilators. Burt Mfg. Co., Akron, O.
Rex—Chain drives, coal and ash conveyors, couplings, nozzles, bearings, pumps. Chain Belt Co., Milwaukee, Wis.
Rex—Fans, ventilators, wheels. Air Controls, Inc., Div. of Cleveland Heater Co., Cleveland, O.
Rexarc—Electrodes, welders. Sight Feed Generator Co., West Alexandria, O.
Rex-Flex—Ducts. Chicago Metal Hose Corp., Maywood, Ill.
Rexoil—Burners, heaters. Reif-Rexoil, Inc., Buffalo, N. Y.
Rex-Tube—Duct connections. Chicago Metal Hose Corp., Maywood, Ill.
Rexvane—Fans. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Rex-Weld—Hose, ducts. Chicago Metal Hose Corp., Maywood, Ill.
Richmond Heatomat—Heaters. Richmond Radiator Co., New York, N. Y.
Ridal—Cleaning compounds, water treatment. Apex Engineering Co., Chicago, Ill.
Ridgid—Pipe machines, wrenches, cutters, vises. Ridge Tool Co., Elyria, O.
Rid-Sludge — Cleaning compounds, corrosion treatment. Apex All Weather Products, Chicago, Ill.
Rifco—Unions. Rhode Island Fittings Co., Hillsgrove, R. I.
Riflex—Vibration absorbers. United Metal Hose Co., Inc., Long Island City, N. Y.
Rihco—Humidifiers. Rhode Island Humidifier & Ventilator Co., Boston, Mass.
Rincontrol—Enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Rip-pl—Enamels and lacquers. Hilo Varnish Corp., Brooklyn, N. Y.
Ripple-Fin—Cooling and heating surface. Mcquay, Inc., Minneapolis, Minn.
Risselt—Air valves. Moreheat Distribution, Inc., Cincinnati, O.
Robinson—Brakes, punches. New Albany Machine Mfg. Co., New Albany, Ind.
Robot-Eye—Regulators, smoke alarms, combustion control systems. General Power Plant Corp., New York, N. Y.
Rockwell—Blast gates. Thermix Corp., The, Greenwich, Conn.
Rocop—Heaters. Rome-Turney Radiator Co., Rome, N. Y.
Rodpax—Packing. National Engineering Products, Inc., Washington, D. C.
Ro-Flo—Compressors. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Rolagrip—Couplings. Gustin Bacon Mfg. Co., Kansas City, Mo.
Rol-Air—Tools. Imperial Brass Mfg. Co., Chicago, Ill.
Roll-a-Bend—Pipe benders. Radiant Devices, St. Louis, Mo.
Rollway—Pumps. Pioneer Pump & Mfg. Co., Detroit, Mich.
Roofvane—Ventilators. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Ross—Pipe joints. Webster & Co., Warren, Camden, N. J.
Rotameter—Flow meters. Schutte & Koerting Co., Philadelphia, Pa.
Rotary—Ventilators. Swartwout Co., Cleveland, O.
Roto Blast—Furnaces. Moncrief Furnace Co., Atlanta, Ga.
Roto-Clone—Dust collectors. American Air Filter Co., Inc., Louisville, Ky.
Rotojet—Spray nozzles. Binks Mfg. Co., Chicago, Ill.
Roto-louvre—Dryers. Link-Belt Co., Chicago, Ill.
Rotomet—Solder and fluxes. Rotometals, Inc., San Francisco, Calif.
Rotometric—Solder and fluxes. Rotometals, Inc., San Francisco, Calif.
Roto-Torq—Tools. Richmont, Inc., Los Angeles, Calif.
Roto-trol—Liquid pressure regulators, indicators, and switches. Healy Ruff Co., St. Paul, Minn.
Rotre—Vacuum pumps. Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Ro-Twin—Air compressors. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Roxaprene—Protective coatings, enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Roxite—Pipe. United States Stoneware Co., New York, N. Y.
Roxyn C—Enamels and lacquers, protective coatings. Interchemical Corp., Finishes Div., Newark, N. J.
Royal—Gas fired heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Royal Clipper—Cutters and shears. M-M-A, Inc., Lancaster, Pa.
Rubalt—Enamels and lacquers. Hague & Co., Alfred, Brooklyn, N. Y.
Rubatex—Insulation. Virginia Rubatex Div., Great American Industries, Inc., Bedford, Va.
Rubyfluid—Solder. Ruby Chemical Co., Columbus, O.
Rusco—Insulation. Russell Co., F. C., The, Cleveland, O.
Rust Bloc No. 20—Coatings. Turco Products, Inc., Los Angeles, Calif.
Rustbuster—Cleaning compounds. Cannon Chemical Co., Inc., Cambridge, Mass.
Rust Evade—Coatings. Turco Products, Inc., Los Angeles, Calif.
Rust Raider—Compounds. Radiator Specialty Co., Charlotte, N. C.
Rust Veto—Protective Coatings. E. F. Houghton & Co., Philadelphia, Pa.
Rydlyme—Cleaning compounds, scale removal service. Apex Engineering Co., Chicago, Ill.

S-A—Conveyors, feeders. Stephens-Adamson Mfg. Co., Aurora, Ill.
SA—Valves. Lunkenheimer Co., Cincinnati, O.
S. C.—Air heaters, gas burners, recorders. Surface Combustion Corp., Toledo, O.
S.F.E.—Insulation. Standard Fuel Engineering Co., Detroit, Mich.
S-N—Air conditioning units, burners, fans, heaters, pumps, stokers. Scott-Newcomb, Inc., St. Louis, Mo.
S & P—Burners, governors, preheaters, regulators, strainers, valves. Staples & Pfeiffer, San Francisco, Calif.
S. R. P.—Protective coatings. Sonneborn Sons, Inc., L., New York, N. Y.
SSIRCO—Ventilators. Southern States Iron Roofing Co., Savannah, Ga.
Saco—Speed reducers. Stephens-Adamson Mfg. Co., Aurora, Ill.
Saf-Dry—Refrigerants. Liquid Carbonic Corp., The, Chicago, Ill.
Safe-Flo—Heaters. Duffy Engrg. Co., Portland, Ore.
Safe-T-Aire—Air sterilizing units. Hanovia Chemical & Mfg. Co., Newark, N. J.

Safety—Heaters. Wing Mfg. Co., L. J., New York, N. Y.

Saftrol—Controls. Penn Electric Switch Co., Goshen, Ind.

Sahara—Dehumidifiers. Niagara Industrial Corp., New York, N. Y.

Saint Louis—Stokers. Ormsby-Osterman, Inc., St. Louis, Mo.

Sairset—Cement. Green Fire Brick Co., Mexico, Mo.

Sal-Mo—Cement, insulation, packing. Sall Mountain Co., Chicago, Ill.

Sanidaire—Humidifiers. United States Air Conditioning Corp., Minneapolis, Minn.

Santocel—Insulation. Monsanto Chemical Co., Merimac Div., Boston, Mass.

Santosite—Water treatment. Monsanto Chemical Co., St. Louis, Mo.

Santrol—Registers. Tuttle & Bailey, Inc., New Britain, Conn.

Saran—Plastic pipe and tubing. Acadia Synthetic Products Div., Western Felt Works, Chicago, Ill.

Satincote—Insulation, building. Insulite Div., Minnesota and Ontario Paper Co., Minneapolis, Minn.

Saunders—Pipe cutters. Erie Tool Works, Erie, Pa.

Saunders—Diaphragm valves. Grinnell Co., Inc., Providence, R. I.

Sauter—Time switches. Cramer Co., Inc., R. W., The, Centerbrook, Conn.

Schmidt—Torches. Minn-Kota Foundry & Mfg. Co., Fargo, N. D.

Schwan—Gas burners. Jamieson Mfg. Co., Dallas, Texas.

Scottie Jr.—Boilers. Kewanee Boiler Co., Kewanee, Ill.

Scroll-Aire—Air heaters. Newcomb-Detroit Co., Detroit, Mich.

Scruin—Bolts. Star Expansion Bolt Co., New York, N. Y.

Scru-peller—Sewage ejectors and pumps. Chicago Pump Co., Chicago, Ill.

Sea Lion—Leather belting. Chicago Belting Co., Chicago, Ill.

Sea Rings—Asbestos packing. Johns-Manville, New York, N. Y.

Sealeak—Compounds. Ampion Corp., Long Island City, N. Y.

Seal Master—Bearings. Stephens-Adamson Mfg. Co., Aurora, Ill.

Seal-Rite—Cement and compounds. Macksons Co., New York, N. Y.

Segweld—Pipe fittings. Gustin Bacon Mfg. Co., Kansas City, Mo.

Seismo-Dampers—Bases. Korfund Co., Inc., Long Island City, N. Y.

Selectair—Air conditioning units. Johnson Co., S. T., Philadelphia, Pa.

Selectric—Electric heaters. Bastian-Morley Co., Inc., LaPorte, Ind.

Selectrol—Regulators. Automatic Control Co., St. Paul, Minn.

Sells—Bearings. Royersford Foundry & Machine Co., Royersford, Pa.

Sensatherm—Thermostats. Mercoid Corp., Chicago, Ill.

Sensitrol—Relays. Weston Electrical Instrument Corp., Newark, N. J.

Sentinel—Pumps. Red Jacket Mfg. Co., Davenport, Ia.

Sentry — Draft controls, draft regulators. Krueger Sentry Gauge Co., Green Bay, Wis.

Sep-return—Separators. Wabash Mfg. Co., Chicago, Ill.

Sequestrene—Water softeners. Alrose Chemical Co., Providence, R. I.

Service—Packing. Johns-Manville, New York, N. Y.

Servicecoat—Enamels and lacquers. Debevoise Co., The, Brooklyn, N. Y.

Sesure—Gages. Yarnall-Waring Co., Philadelphia, Pa.

"77"—Pipe coverings. Eagle-Picher Co., Cincinnati, O.

Shafco—Unit heaters. Overhead Heaters, Inc., Detroit, Mich.

Shawco—Bends, headers. Shaw Co., Benjamin F., Wilmington, Del.

Sheetrock—Sheets and board for ducts. United States Gypsum Co., Chicago, Ill.

Shelby—Tubing. National Tube Co., United States Steel Corp. Sub., Pittsburgh, Pa.

Shield-Arc—Electrodes, arc welders. Lincoln Electric Co., Cleveland, O.

Shockmounts—Bases and pads. Lord Mfg. Co., Erie, Pa.

Shone—Sewage ejectors. Yeomans Bros. Co., Chicago, Ill.

Shuntflo—Meters. Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.

Shutlbrak—Switches. Adam Electric Co., Frank, St. Louis, Mo.

Shut-O-Vent—Louvers and shutters. Reed Unit-Fans, Inc., New Orleans, La.

Silastic—Packing. Dow Corning Corp., Midland, Mich.

Silastic—Industrial adhesive tape. Irvington Varnish & Insulator Co., Irvington, N. J.

Silent-Auburn—Burners, heaters, air conditioning units. Auburn Burner Co., Auburn, Ind.

Silent Automatic—Dampers, louvers and shutters. Airecon Industries, Detroit, Mich.

Silentblu—Gas burners. Beck Engineering Combustion Kompany, St. Louis, Mo.

Silent-Breeze—Propeller fans. Holcomb & Hoke Mfg. Co., Inc., Indianapolis, Ind.

Silent Korth—Burners. Eckhart Mfg. Co., Inc., Roselle, N. J.

Silentvane—Fans. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.

Sil-Fos—Solder. Handy & Harman, New York, N. Y.

Silimite—Water treatment. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Sillimanite—Refractories and refractory cement. Taylor Sons Co., Charles, Cincinnati, O.

Silver Steel—Cutters. E. C. Atkins & Co., Indianapolis, Ind.

Silverstreak—Chain drive. Link-Belt Co., Indianapolis, Ind.

Silver Stream—Spray nozzles. Skinner Irrigation Co., Troy, O.

Silvertop—Eliminators, traps. Anderson Co., V. D., The, Cleveland, O.

Simplex—Gages. Viking Pump Co., Cedar Falls, Ia.

Simplex—Regulators. Bell & Gossett Co., Morton Grove, Ill.

Sim-Trol—Controls. Simplex Mfg. Co., Fond du Lac, Wis.

Sioux—Electric drills. Albertson & Co., Inc., Sioux City, Ia.

Sirocco—Blowers, fans. American Blower Corp., Detroit, Mich.

Skelly—Stokers. Combustion Engineering-Super-Heater, Inc., New York, N. Y.

Skil—Drills, shears. Skilsaw, Inc., Chicago, Ill.

Skilbeck—Humidifiers. Techtmann Industries, Inc., Milwaukee, Wis.

Skip-Tooth—Dies. Nye Tool Co., Chicago, Ill.

Slo-Speed—Reducers. Sterling Electric Motors, Inc., Los Angeles, Calif.

Sludgout—Fuel oil treatment. Metropolitan Refining Co., Inc., Long Island City, N. Y.

Slugin—Bolts. Star Expansion Bolt Co., New York, N. Y.

Smith-Dolan—Electric preheaters and stress relievers. Electric Arc, Inc., Newark, N. J.

Smith-Mills—Boilers. Smith Co., Inc., H. B., Westfield, Mass.

Smoothcote—Insulation, building. Insulite Div., Minnesota & Ontario Paper Co., Minneapolis, Minn.

Snapin—Bolts. Star Expansion Bolt Co., New York, N. Y.

Snap-Rite—Ducts and duct fittings. Gray Metal Products, Inc., Rochester, N. Y.

Sno-Breeze—Air conditioning units. Palmer Mfg. Corp., Phoenix, Ariz.

Softweld—Electrodes. Lincoln Electric Co., Cleveland, O.

Solair—Air conditioning units. Northwest Heating, Inc., Portland, Ore.

Solray—Radiation. Weil-McLain Co., Michigan City, Ind.

Sol-vet—Cleaning compounds, water treatment. Anderson-Stolz Corp., Kansas City, Mo.

Sono-O-Seal—Insulation. General Insulating Products Co., Brooklvn, N. Y.

So-Salts—Solder. Turco Products, Inc., Los Angeles, Calif.

Soundliner—Insulation. Baldwin-Hill Co., Trenton, N. J.

South Wind—Heaters. Stewart-Warner Corp., Heating Div., Indianapolis, Ind.

Sovabead—Dehumidifiers. Socony-Vacuum Oil Co., Inc., New York, N. Y.

Sovereign—Packing. Darcoid Co., Inc., New York, N. Y.

Spartan—Packing. Graton & Knight Co., Worcester, Mass.

Spearhead—Gasket cutters. Zimmerman Packing Co., Cincinnati, O.

Special X—Solder. Industrial Service Laboratories, Milwaukee, Wis.

Speed Clamps—Hose clamps. Tinnerman Products, Inc., Cleveland, O.

Speed Clips—Insulation fasteners. Tinnerman Products, Inc., Cleveland, O.

Speed-Cord—Belt drives. Gates Rubber Co., The, Denver, Colo.

Spee-Dee—Blue print and white print machines. Peck & Harvey, Chicago, Ill.

Speed-Flex—Flat belt drives. Gates Rubber Co., The, Denver, Colo.

Speed Heater—Unit heaters. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.

Speed Nuts—Locknuts. Tinnerman Products, Inc., Cleveland, O.

Speed Prime—Pumps. Chain Belt Co., Milwaukee, Wis.

Speed-Trol—Changers. Sterling Electric Motors, Inc., Los Angeles, Calif.

Speedweld—Electrodes. Trindl Products, Ltd., Chicago, Ill.

Speedylectric—Boilers, heaters. Livingstone Engineering Co., Worcester, Mass.

Speedyvent—Air eliminators. Livingstone Engineering Co., Worcester, Mass.

Spekaluminite — Coatings. Special Chemicals Corp., New York, N. Y.

Sphero—Blow-off valves. Fairbanks Co., New York, N. Y.

Spinner—Ventilators. Inland Steel Products Co., Milwaukee, Wis.

Spiralock—Pipe coils, tubing. B & M Mfg. Co., East Orange, N. J.

Spiralock—Pulleys and sheaves. Scientiae Tool Co., Dayton, Ohio.

Spiratube—Ducts and duct fittings. Flexible Tubing Corp., Branford, Conn.

Spiraweld—Pipes. Naylor Pipe Co., Chicago, Ill.

Spiro—Heaters. Stout & Sons, David, St. Louis, Mo.

Spirodome—Spray nozzles. Fluor Corp., Ltd., The, Los Angeles, Calif.

Spirovane—Fans. Western Blower Co., Seattle, Wash.

Spongex—Bases and pads, gaskets, insulation. Sponge Rubber Products Co., Shelton, Conn.

Spot-Aire—Air conditioning units. Drayer & Hanson, Inc., Los Angeles, Calif.

Spraco—Booths, nozzles, separators, strainers, washers. Spray Engineering Co., Somerville, Mass.

Spra-Rite—Nozzles. Binks Mfg. Co., Chicago, Ill.

Spray-Acoustic—Insulation. Sprayo Flake Co., Chicago, Ill.

Spraywheel—Air washers. Mountain States Equipment Co., Denver, Colo.

Springin—Bolts. Star Expansion Bolt Co., New York, N. Y.

Square-Heat—Boilers. Kewanee Boiler Corp., Kewanee, Ill.

Stabilflo—Valves. Foxboro Co., Foxboro, Mass.

Stack-Head—Dampers. Air Control Products, Inc., Coopersville, Mich.

Stacon—Regulators, valves. Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.

Sta-Gloss—Steel sheets. Jessop Steel Co., Washington, Pa.

Stainlend—Electrodes. Arcos Corp., Philadelphia, Pa.

Stainweld—Electrodes. Lincoln Electric Co., Cleveland, O.

Standard—Ventilators. Burt Mfg. Co., Akron, O.

Standardaire—High pressure blowers. Standard Stoker Co., Inc., Erie, Pa.

Standco—Bearings. Standard Pressed Steel Co., Jenkintown, Pa.

Standforated—Grilles. Standard Stamping & Perforating Co., Chicago, Ill.

Starbird—Pressure and vacuum switches. Meletron Corp., Los Angeles, Calif.

Star-Quality—Nipples. Star Tubular Products Co., Chicago, Ill.

Statick—Ventilators. Hirschman-Pohle Co., Inc., Le Roy, N. Y.

Staxauster—Roof ventilators. Allen Ventilator Div., Production Planning Co., Rochester, Mich.

Staynew—Filters. Dollinger Corp., Rochester, N. Y.

Stazin—Bolts. Star Expansion Bolt Co., New York, N. Y.

Steam-Pak—Steam generator unit, heaters. York-Shipley, Inc., York, Pa.

Steelweld—Brakes, shears. Cleveland Tramrail Div., Cleveland, Crane & Eng. Co., Wickliffe, O.

Steen—Cutters, pipe cleaning machines. Continental Machine Co., Chicago, Ill.

Sterilamp—Lamps. Westinghouse Electric Corp., Pittsburgh, Pa.

Sterlco—Controls, pumps, strainers, heating systems, regulators, traps, valves. Sterling, Inc., Milwaukee, Wis.

Sterling—Compressors, condensers, valves, pipe coils. Reynolds Mfg. Co., Springfield, Mo.

Stictite—Cement. Refractory & Insulation Corp., New York, N. Y.

Stillson—Pipe wrenches. Erie Tool Works, Erie, Pa.

Stok-A-Fire—Stokers. Automatic Firing Corp., St. Louis, Mo.

Stokerator—Stokers. Northern Steel & Stoker Corp., Peoria, Ill.

Stokerelay—Relays. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Storm-King—Ducts and duct fittings. Ohio Valley Hardware & Roofing Co., Evansville, Ind.

Storm Shade—Windows. Ingersoll Steel Div., Borg-Warner Corp., Chicago, Ill.

Strahman—Boiler gage cocks, valves. Klingerit Inc., New York, N. Y.

Straitflo—Strainers. Hays Mfg. Co., Erie, Pa.

Streamjet—Spray nozzles. Spraying Systems Co., Bellwood, Ill.

Streamline—Couplings, cutters, fittings, heat exchangers, manifolds, nipples, pipe, strainers, tubing, unions, valves. Mueller Brass Co., Port Huron, Mich.

Streamliner—Registers. Auer Register Co., Cleveland, O.

Streamliner—Belting. Gilmer Co., L. H., Div. of United States Rubber Co., Philadelphia, Pa.

Stronghold—Belting. Rhoads & Sons, J. E., Philadelphia, Pa.

Studin—Bolts. Star Expansion Bolt Co., New York, N. Y.

Stud-Pak—Insulation. United States Mineral Wool Co., South Milwaukee, Wis.

Sturdybender—Power brakes. Bath Co., Cyril, The, Cleveland, O.

Submersion—Boilers, water heaters. Stout & Sons, David, St. Louis, Mo.

Sullivan—Controls. Cole-Sewell Engineering Co., St. Paul, Minn.

Sunrad—Direct radiation. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

Super—Insulating cement. Union Asbestos & Rubber Co., Cicero, Ill.

Super Air Screws—Fans. Marathon Electric Mfg. Corp., Wausau, Wis.

Supercutno—Packing. Greene, Tweed & Co., North Wales, Pa.

Super-deLavaud—Pipe. U. S. Pipe & Foundry Co., Burlington, N. J.

Superector—Wrenches. Williams & Co., J. H., Buffalo, N. Y.
Superex—Insulation. Johns-Manville, New York, N. Y.
Super-Fan—Fan blades. Norwin Co., Freeport, Ill.
Super-Felt—Insulation. Johns-Manville, New York, N. Y.
Superflux—Solder. Paul-Lewis Laboratories. Inc., Milwaukee, Wis.
Superheat—Gas burners. Selas Corp. of America, Philadelphia, Pa.
Superior—Fans. American Foundry & Furnace Co., Bloomington, Ill.
Superior—Gas fired heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Super-Power—Drives. Baldwin Belting, Inc., New York, N. Y.
Superratchet—Ratchet wrenches. Williams & Co., J. H., Buffalo, N. Y.
Superrench—Tools. Williams & Co., J. H., Buffalo, N. Y.
Superseal—Fittings. Grinnell Co., Inc., Providence, R. I.
Super 7—V belts. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Super Silvertop—Traps. The V. D. Anderson Co., Cleveland, O.
Super "66"—Insulation. Eagle-Picher Co., Cincinnati, O.
Supersheat—Gaskets. Greene, Tweed & Co., North Wales, Pa.
Super T—Systems. Tork Clock Co., Mount Vernon, N. Y.
Supertan—Leather belting and v-belts. Baldwin Belting, Inc., New York, N. Y.
Supertemp—Insulation. Eagle-Picher Co., Cincinnati, O.
Super Thermo Stucco—Cement. Chicago Fire Brick Co., Chicago, Ill.
Super X—Sheets. Western Brass Div. of Olin Industries, Inc., East Alton, Ill.
Super X—Coatings. Nelson Mfg. Co., B. F., Minneapolis, Minn.
Sure Return—Condensation return pumps. Chicago Pump Co., Chicago, Ill.
Sureweld—Electrodes, welders. National Cylinder Gas Co., Chicago, Ill.
Sweatflow—Valves. Quality Specialty Co., Inc., Philadelphia, Pa.
Sylphon—Steam traps. Webster & Co., Warren, Camden, N. J.
Synchro—Valves. The Bristol Co., Waterbury, Conn.
Synchro-Lectric—Viscosimeters. Brookfield Engineering Laboratories, Inc., Stoughton, Mass.
Synchro-Meter—Meters. Bailey Meter Co., Cleveland, O.
Synchron—Motors. Hansen Mfg. Co., Inc., Princeton, Ind.
Synchro-Thermetron—Heating systems. Whittington Pump & Engineering Corp., Indianapolis, Ind.
Synchrotie—Recorders. Westinghouse Electric Corp., Pittsburgh, Pa.
Syncretizer—Unit ventilators. Nesbitt, Inc., John J., Philadelphia, Pa.
Syncrogear—Speed reducers. U. S. Electrical Motors, Inc., Los Angeles, Calif.
Syndolag—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.
Syphonaire—Ventilators. Western Engineering & Mfg. Co., Los Angeles, Calif.

T. N.—Valves. Imperial Brass Mfg. Co., Chicago, Ill.
T.T.—Smoke guns. Hill, E. Vernon & Co., Chicago, Ill.
Tabasco—Water heaters. Kewanee Boiler Corp., Kewanee, Ill.
Tag—Humidstats, colorimeters, hygrometers, gages, indicator-controllers, operators, psychrometers, recorders, regulators, thermometers, valves. Tagliabue Corp., C. J., Newark, N. J.
Tampico—Air filters. Chicago Filter Co., Joliet, Ill.
Tampin—Bolts. Star Expansion Bolt Co., New York, N. Y.
Tanco—Insulation, duct, sound deadening. Thompson & Co., Oakmont, Pa.
Tank-Kleen—Fuel oil treatment. Celco Corp., New York, N. Y.
Tank-O-Meter—Gages, indicators. Uehling Instrument Co., Paterson, N. J.
Tanktrol—Regulators. Automatic Control Co., St. Paul, Minn.
Tannate—Belting, packing. Rhoads & Sons, J. E., Philadelphia, Pa.
Tannate-Rockwood—Belt drives. Rhoads & Sons, J. E., Philadelphia, Pa.
Tasil—Furnace cement. Taylor Sons Co., Charles, Cincinnati, O.
Tayco—Furnace and refractory cement, refractories. Taylor Sons Co., Charles, Cincinnati, O.
TEG—Humidifiers, sterilizing units. National Air Conditioning Inc., Johnstown, Pa.
Teksag Colloid—Boiler cleaning compounds. Agnew & Tomlinson, Long Island City, N. Y.
Telemaster—Relays. Tork Clock Co., Inc., Mt. Vernon, N. Y.
Teletrol—Window ventilator units. Airgard Mfg. Co., Chicago, Ill.
Tellevel—Indicators, switches. Stephens-Adamson Mfg. Co., Aurora, Ill.
Teltru—Anemometers, gages. Hill, E. Vernon & Co., Chicago, Ill.
Tem-Clock (Electric)—Time switches. Penn Electric Switch Co., Goshen, Ind.
Temflex—Plastic tubing. Irvington Varnish & Insulator Co., Irvington, N. J.
Temlok—Insulation. Armstrong Cork Co., Lancaster, Pa.
Tempmaster—Thermostats. Crown Controls Co., Inc., New Bremen, O.
Tempscribe—Recorders. Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Temptrol—Insulation. Badnam Insulation Co., Inc., Birmingham, Ala.
Temtrol—Thermostats. Penn Electric Switch Co., Goshen, Ind.
Tensulate—Insulation. Tennessee Products and Chemical Corp., Nashville, Tenn.
Terra Therm—Air conditioning units. Webber Engineering Corp., Indianapolis, Ind.
Testite—Fittings. General Fittings Co., Providence, R. I.
Texiron—Pulleys and sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Texrope—V-belt drives, pulleys, v-belts. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Texslide—Motor bases. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Texsteel—Pulleys and sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Texolite—tubing, General Electric Co., Chemical Dept., Pittsfield, Mass.
Tharco—Cement. The Armstrong Co., Detroit, Mich.
Thawzone—Dehydrant and acid neutralizer. Highside Chemicals Co., Clifton, N. J.
Thermalbridge—Thermometers. Thompson Research & Mfg. Co., Davenport, Fla.
Thermal Electric—Heaters, pipe, preheaters, transformers. Fluid Systems, Inc., New Haven, Conn.
Thermalfin—Unit coolers. Thermal Co., Inc., Milwaukee, Wis.
Thermatrol—Valves. Schnacke, Inc., Evansville, Ind.
Therm-Cote—Radiation. Tilco-Fin-Tubing Div., of David E. Kennedy, Inc., Brooklyn, N. Y.
Thermek—Heating and cooling surface. Peerless of America, Inc., Chicago, Ill.
Thermidaire—Burners, furnaces, heaters. Campbell Heating Co., E. K., Kansas City, Mo.
Thermix—Dust collectors, fans, blowers, heat exchangers. Prat-Daniel Corp., East Port Chester, Conn.
Thermo—Expansion valves. Alco Valve Co., St. Louis, Mo.
Thermo—Heaters. American Furnace Co., St. Louis, Mo.
Thermobloc—Air heaters. Prat-Daniel Corp., East Port Chester, Conn.
Thermochek—Controls. Bell & Gossett Co., Morton Grove, Ill.
Thermo-Draulik—Operators, regulators. Perfex Corp., Milwaukee, Wis.
Thermodrive—Speedchangers, pulleys and sheaves. Webster Electric Co., Racine, Wis.
Thermoflex—Strainers, heating systems, radiator orifices, traps, valves. Cashin Co., W. D., Boston, Mass.
Thermoflo—Valves. Bell & Gossett Co., Morton Grove, Ill.
Thermo-Flow—Heat exchangers. Thermal Industries, Indio, Calif.
Thermofuel—Furnaces. Beck Engineering Combustion Kompany, St. Louis, Mo.
Thermogage—Thermometers. Hotstream Heater Co., Cleveland, O.
Thermogas—Furnaces. Beck Engineering Combustion Kompany, St. Louis, Mo.
Thermo Grip—Torches. Ideal Industries, Inc., Sycamore, Ill.
Thermoguide—Thermometers. Taylor Instrument Companies, Rochester, N. Y.
Thermo-Humidigraph — Recorder-controllers. Bristol Co., The, Waterbury, Conn.
Thermoil—Furnaces, unit heaters. Beck Engineering Combustion Kompany, St. Louis, Mo.
Thermolator—Valves. Triplex Heating Specialty Co., Inc., Peru, Ind.
Thermolier—Unit heaters. Grinnell Co., Inc., Providence, R. I.
Thermo-Limit—Valves. Alco Valve Co., St. Louis, Mo.
Thermopane — Windows. Libbey-Owens-Ford Glass Co., Toledo, O.
Thermoswitch—Thermostats. Fenwal, Inc., Ashland, Mass.
Therm-o-tile—Conduit. Porter & Co., Inc., H. W., Newark, N. J.
Thermotrol—Valves. Sterling Engineering Co., Milwaukee, Wis.
Therm-otrols—Thermometers. Wheelco Instruments Co., Chicago, Ill.
Thermovent—Unit ventilators. Nesbitt, Inc., John J., Philadelphia, Pa.
Thermovoir—Water heaters. Bell & Gossett Co., Morton Grove, Ill.
Thin Man—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Thor—Belting. Goodyear Tire & Rubber Co., Akron, O.
Thor—Drills, pumps, reamers, shears, valve reseaters. Independent Pneumatic Tool Co., Aurora, Ill.
Thorobred—V belts and v belt drives. Dayton Rubber Co., Dayton, O.
Thread King—Portable machines. Century Engineering Co., Los Angeles, Calif.
Thredolets—Fittings. Bonney Forge & Tool. Wks., Allentown. Pa.
3C—Motor controls. Clark Controller Co., Cleveland, O.
Thrift—Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.
Throway—Air filters. American Air Filter Co., Inc., Louisville, Ky.
Thur-Ma-Lox—Coatings. Dampney Co. of America, Hyde Park, Boston, Mass.
Ticotherm—Boilers. Titusville Iron Works Co., The, Titusville, Pa.
Tilt Trap—Steam traps. Nason Co., Detroit, Mich.
Timercoid—Time switches. Mercoid Corp., Chicago, Ill.
Timerelay—Relays. Minneapolis-Honeywell Regulator Co., Minneapolis. Minn.
Time-O-Stat—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Time Saver—Damper regulators. Goese Mfg. Co., Milwaukee, Wis.
Tin-Ezy—Coatings, solder and fluxes. Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
Tin-Loy—Solder. Eagle-Picher Co., Cincinnati, O.
Tiny—Traps. Nason Co., Detroit, Mich.
Titan—Traps. Nason Co., Detroit, Mich.
Tite Seal—Cement and compounds. Radiator Specialty Co., Charlotte, N. C.
Tom Thumb—Pipe machines, Oster Mfg. Co., Cleveland, O.
Toolweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Torchweld—Regulators, valves, welding and cutting apparatus. National Cylinder Gas Co., Chicago, Ill.
Torkflash—Wrenches. Blackhawk Mfg. Co., Milwaukee, Wis.
Tork Master—Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.
Torkotherm—Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.
Torpedo—Dehydrators, filters. Imperial Brass Mfg. Co., Chicago, Ill.
Torqometer—Torque indicating wrenches. Snap-on Tools Corp., Kenosha, Wis.
Torq-Stop—Wrenches. Richmont, Inc., Los Angeles, Calif.
Trace—Refrigerant leak detectors. Highside Chemicals Co., Clifton, N. J.
Transflex—Plastic tubing. Irvington Varnish and Insulator Co., Irvington, N. J.
Transite—Conduit, pipe, ducts and duct fittings, refractories, sheets and board. Johns-Manville, New York, N. Y.
Transparent — Analyzers, gages, manometers. Dwyer Mfg. Co., F. W., Chicago, Ill.
Trap-Dri—Dehydrators. Automatic Products Co., Milwaukee, Wis.
Trap-it—Filters. Automatic Products Co., Milwaukee, Wis.
Tray—Cooling towers. New England Cooling Tower Co., Boston, Mass.
Treet-O-Control—Steam system and water treatment. % Proportioneers, Inc. %, Providence, R. I.
Treet-O-Unit—Feeders, pumps. % Proportioneers, Inc. %, Providence, R. I.
Trentweld—Tubing. Trent Tube Mfg. Co., East Troy, Wis.
Triad—Stocks and dies. Nye Tool & Machine Co., Chicago, Ill.
Tri-Clad—Motors. General Electric Co., Apparatus Dept., Schenectady, N. Y.
Trident—Meters. Neptune Meter Co., New York, N. Y.
Tri-Flex—Registers, grilles. Tuttle & Bailey, Inc., New Britain, Conn.
Tri-Flux—Solder. Wolfe-Kote Co., Inc., Sheboygan, Wis.
Trimo—Cutters, tongs, vises, wrenches. Trimount Mfg. Co., Div. of Aetna Industrial Corp., Boston, Mass.
Trimtherm—Thermostats. General Controls Co., Glendale, Calif.
Triple-A—Enamels and lacquers, protective coatings. Quigley Co., Inc., New York, N. Y.
Triple Duty—Heating systems. Bell & Gossett Co., Morton Grove, Ill.
Triple-Seal—Fittings. Imperial Brass Mfg. Co., Chicago, Ill.
Triple Seal—Circulators. Standard Electric Mfg. Co., West Berlin, N. J.
Triplex—Stocks and dies. Nye Tool Co., Chicago, Ill.
Tripl-Mix—Cement. Krehbiel Co., J. H., Chicago, Ill.
Tri-Rotor—Pumps. Yale & Towne Mfg. Co., Stamford, Conn.
Tri-trol — Regulators, switches, thermostats. Marsh Heating Equipment Co., Skokie, Ill.
Triumph—Gages and indicators. Boston Auto Gage Co., Pittsfield, Mass.
Trojan—Boilers. Burnham Corp., Boiler Div., Irvington, N. Y.
Trojan—Stokers. Auburn Burner Co., Auburn, Ind.
Tropelite—Coatings. Tropical Paint & Oil Co., Cleveland, O.

Tropic-Breeze—Air conditioning units. Dalzen Tool & Mfg. Co., Detroit, Mich.
Tropilux—Enamels and lacquers. Tropical Paint & Oil Co., Cleveland, O.
Tru-Air—Air conditioning units. Blazer, M., & Son, Passaic, N. J.
Truflex—Bi-metals. General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Truliradiant—Gas burners. Gold Top Heating, Inc., Butte, Mont.
Trumark—Protractor for marking pipe. Tru-Line Corp., Los Angeles, Calif.
Try-Me—Regulators, strainers, valves. Tryco Products, Inc., Westfield, Mass.
Tubecote—Protective coatings. Wilhelm Co., A., Reading, Pa.
Tubejet—Compressors, ejector type vacuum pump. Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Tube Master—Flaring tools, machines. Leonard Precision Products Co., Garden Grove, Calif.
Tuff-Bond—Adhesives. Moore Inc., Goodloe E., Danville, Ill.
Tuff-Cote—Adhesives, cement. Moore Inc., Goodloe E., Danville, Ill.
Tufflex—Insulation. Wood Conversion Co., St. Paul, Minn.
Tuf-flex—Gage and sight glasses. Libbey-Owens-Ford Glass Co., Toledo, O.
Tuf-On—Protective coatings. Brooklyn Varnish Mfg. Co., Brooklyn, N. Y.
Tulox—Plastic pipe and tubing. Extruded Plastics, Inc., Norwalk, Conn.
Tumblin—Bolts. Star Expansion Bolt Co., New York, N. Y.
Turbine Driven—Heaters. Wing Mfg. Co., L. J., New York, N. Y.
Turbo—Air washers, spray nozzles. Bayley Blower Co., Milwaukee, Wis.
Turbo Vane—Fans and blowers. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Turbulaire—Dryers. Western Precipitation Corp., Los Angeles, Calif.
Turret—Pumps. Yeomans Bros. Co., Chicago, Ill.
Tuway—Strainers. Wright-Austin Co., Detroit, Mich.
20th Century—Bearings. Roller Bearing Co., of America, Trenton, N. J.
Twin Contact—Controls, switches, thermostats. Perfex Corp., Milwaukee, Wis.
Twindow—Heat insulating windows. Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Twin G-Fin—Preheaters. Griscom-Russell Co., The, New York, N. Y.
Twin-Line — Pumps. Cooper-Bessemer Corp., The, Mt. Vernon, O.
Twin Seal—Check valves, gage testers. Mansfield & Green, Cleveland, O.
Tygon—Protective coatings, plastic tubing. U. S. Stoneware Co., New York, N. Y.
Tylox—Pipe couplings. United States Stoneware Co., New York, N. Y.
Tymit—Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.

U S—Fittings, flanges, tank plugs. U. S. Plug & Fitting Co., Cleveland, O.
U. S.—Heaters. United States Radiator Corp., Detroit, Mich.
US-Capitol—Boilers, hangers or brackets, heaters, radiation. United States Radiator Corp., Detroit, Mich.
US-Capitolaire—Air conditioning units. United States Radiator Corp., Detroit, Mich.
USG—Louvers and shutters. United States Gypsum Co., Chicago, Ill.
U. S. S.—Angles, sheets. Carnegie-Illinois Steel Corp., United States Steel Corp., Subsidiary, Pittsburgh, Pa.
U. S. S.—Pipe, tubing. National Tube Co., United States Steel Corp., Subsidiary, Pittsburgh, Pa.
U-S-S—Sheets, angles. Columbia Steel Co., United States Steel Corp., Subsidiary, San Francisco, Calif.
USS—Sheets. Tennessee Coal, Iron & Railroad Co., United States Steel Corp. Subsidiary, Birmingham, Ala.
UTA—Pumps. American-Marsh Pumps, Inc., Battle Creek, Mich.
Ugasco—Gaskets. United States Gasket Co., Camden, N. J.
U-Loy—Sheets. Republic Steel Corp., Cleveland, O.
Ultralite—Insulation. Gustin Bacon Mfg. Co., Kansas City, Mo.
Unamatic—Automatic arc welding equipment. Una Welding, Inc., Cleveland, O.
Unarco—Insulation, gaskets, packing. Union Asbestos & Rubber Co., Cicero, Ill.
Unbrako—Repair plugs. Standard Pressed Steel Co., Jenkintown, Pa.
Unibestos—Insulation. Union Asbestos & Rubber Co., Cicero, Ill.
Unichrome—Enamels and lacquers. United Chromium, Inc., New York, N. Y.
Unicoils—Air conditioning unit. Clarage Fan Co., Kalamazoo, Mich.
Uniduct—Ducts and duct fittings. General Corporation, Minneapolis, Minn.
Uni-fin—Grilles, registers. Barber-Colman Co., Rockford, Ill.
Uniflare—Fittings. Scovill Mfg. Co., Waterbury, Conn.
Uniflex—Metal hose. Brockway Co., Naugatuck, Conn.
Uni-flo—Dampers, diffusers, grilles, registers. Barber-Colman Co., Rockford, Ill.
Uniflow—Oil burners. Ace Engineering Co., Chicago, Ill.
Unipack—Welding fume exhausters, centrifugal fans. American Machine Products Co., Marshalltown, Ia.
Unipump—Pumps. Weinman Pump Mfg. Co., Columbus, O.
Unishears—Electric shears. Stanley Electric Tools, Div. of The Stanley Works, New Britain, Conn.
Unisorb—Bases and pads. Felters Company, The, Boston, Mass.
Unitaire—Air conditioning units. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Unitem—Heaters. Bell & Gossett Co., Morton Grove, Ill.
Unitherm—Unit heaters. Clarage Fan Co., Kalamazoo, Mich.
UniTrane—Air conditioning units. Trane Co., The, La Crosse, Wis.
Universal—Benders. Hossfeld Mfg. Co., Winona, Minn.
Universal—Burners. Dalzen Tool & Mfg. Co., Detroit, Mich.
Universal—Cast iron pipe. Central Foundry Co., New York, N. Y.
Universal—Centrifugal pumps. Bell & Gossett Co., Morton Grove, Ill.
Universal—Gas and oil burners. Mettler Co., Lee B., Los Angeles, Calif.
Universal—Packing. Johns-Manville, New Yorl N. Y.
Universal—Pipe cutters. Nye Tool Co., Chicago, Ill.
Universal—Regulators. Dockson Corp., Detroit, Mich.
Universal Unaflow—Engines. Skinner Engine Co., Erie, Pa.
Uni-Wash—Dust collectors. Newcomb-Detroit Co., Detroit, Mich.
Upson—Bolts and studs. Republic Steel Corp., Bolt & Nut Div., Cleveland, O.
usAIRco—Air conditioning equipment, blowers, condensers, fans, grilles, heaters. United States Air Conditioning Corp., Minneapolis, Minn.
Uskon—Conductors. United States Rubber Co., New York, N. Y.
Utility—Blowers. American Blower Corp., Detroit, Mich.
Utility—Roof ventilators. Arex Co., Chicago, Ill.
Utility—Heaters. Wing Mfg. Co., L. J., New York, N. Y.

V*S—Changers. Reliance Electric & Engineering Co., Cleveland, O.
Vac-Airid—Valves. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Vacumatic—Ejectors, pumps. Whittington Pump & Engineering Corp., Indianapolis, Ind.
Vacuumstat—Switches. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Vad—Cooling towers. Young Radiator Co., Racine, Wis.
Valcalox—Damper regulators. Young Regulator Co., Cleveland, O.
Valdura—Enamel. American-Marietta Co., Chicago, Ill.
Valvactor—Valve operators. Foxboro Co., Foxboro, Mass.
Valvent—Roof ventilators, Swartwout Co., Cleveland, O.
Valvrator—Valves. Fischer & Porter Co., Hatboro, Pa.
Vapomaster—Air sterilizing units. Robertson Sons, Inc., M. F., Lansdowne, Pa.
Vapomatic—Sterilizing units. Robertson Sons, Inc., M. F., Lansdowne, Pa.
Vaporene—Corrosion inhibition. Metropolitan Refining Co., Inc., Long Island City, N. Y.
VapoRette—Sterilizing units. Robertson Sons, Inc., M. F., Lansdowne, Pa.
Vapor-Clarkson—Heating and process boilers. Vapor Heating Corp., Chicago, Ill.
Vaporstat — Switches. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Varidrive—Speed changers. U. S. Electrical Motors, Inc., Los Angeles, Calif.
Varipitch—Pulleys and sheaves. Gates Rubber Co., The, Denver, Colo.
Vari-Pitch—Speed changers, pulleys and sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Variport—Valves. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Vari-Vac—Heating systems. Dunham Co., C. A., Chicago, Ill.
Vari-Vent—Valves. Dole Valve Co., Chicago, Ill.
Veeco—Leak detectors. Vacuum-Electronic Engineering Co., Brooklyn, N. Y.
Vee Jet—Spray nozzles. Spraying Systems Co., Bellwood, Ill.
Veelos—V-belts. Manheim Mfg. & Belting Co., Manheim, Pa.
Velometer—Air velocity meters, anemometers. Illinois Testing Laboratories, Inc., Chicago, Ill.
Ventalarm—Alarms. Scully Signal Co., Cambridge, Mass.
Ventfab—Connections, duct, flexible. Iden Mfg. Co., Chicago, Ill.
Vento—Traps. Haines & Co., William S., Philadelphia, Pa.
Vent-Rite—Air valves. Anderson Products, Inc., Cambridge, Mass.
Ventube—Ducts and duct fittings. E. I. du Pont de Nemours & Co., Inc., Fabrics & Finishes Dept., Wilmington, Del.
Ventura—Fans. American Blower Corp., Detroit, Mich.
Venturafin—Unit heaters. American Blower Corp., Detroit, Mich.
Venturi—Fan housings. Commercial Shearing & Stamping Co., Youngstown, O.
Venturi—Meters. Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Venturi-Flo—Air diffusers. Barber-Colman Co., Rockford, Ill.
Vent-Vac—Heating systems. Anderson Products, Inc., Cambridge, Mass.
Verco—Insulating cement. Nelson Mfg. Co., B. F., Minneapolis, Minn.
Vercoustic—Insulation. Nelson Mfg. Co., B. F., Minneapolis, Minn.
Vermiculite—Insulation. International Vermiculite Co., Girard, Ill.
Vernier-Set—Time switches. Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Versalend—Arc welding electrodes. Arcos Corp., Philadelphia, Pa.
Vertical—Unit heaters. American Blower Corp., Detroit, Mich.
Vertiflow—Unit heaters. Young Radiator Co., Racine, Wis.
V-Flat—Pulleys and sheaves. Dayton Rubbei Co., Dayton, O.
Vibracork—Bases and pads. Korfund Co., Inc., Long Island City, N. Y.
Vibrasafe—Absorbers. Pleasantaire Corp., Washington, D. C.
Vibrashock—Bases and pads. Robinson Aviation, Inc., Vibrashock Div. Teterboro, N. J.
Vibra-sorber—Vibration absorbers. Chicago Metal Hose Corp., Maywood, Ill.
Vibro-Bar—Bases and pads. Korfund Co., Inc., Long Island City, N. Y.
Vibro Insulators—Bases. Goodrich Co., B. F., Akron, O.
Vibro-Isolator—Bases and pads. Korfund Co., Inc., Long Island City, N. Y.
Victor—Traps. Wright-Austin Co., Detroit, Mich.
Victory—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Victron—Electric motors, louvers and shutters, propeller fan blades and fans. Victor Electric Products, Inc., Cincinnati, O.
Vim—Gaskets, leather packing. Houghton & Co., E. F., Philadelphia, Pa.
Vim Tred—Leather belting. Houghton & Co., E. F., Philadelphia, Pa.
Visaflame—Controls. Mercoid Corp., The, Chicago, Ill.
Visco—Preheaters. Crotty Mfg. Corp., Long Island, N. Y.
Viscorator—Viscosimeters. Fischer & Porter Co., Hatboro, Pa.
Visi Flo—Sight glasses. O P W Corp., Cincinnati, O.
VisOdry—Dehydrators. Western Thermal Equipment Co., Los Angeles, Calif.
Visoleak—Detectors. Western Thermal Equipment Co., Los Angeles, Calif.
Vistand—Vise stands. Armstrong Mfg. Co., Bridgeport, Conn.
Vitalloy—Wrenches. Billings & Spencer Co., Hartford, Conn.
Vitra-Carlite—Enamels and lacquers. Hilo Varnish Corp., Brooklyn, N. Y.
Vitricel—Refractories. Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O.
Vitriram—Furnace cement. U. S. Stoneware Co., New York, N. Y.
Vix-Syn—Rubber and synthetic packing. Houghton & Co., E. F., Philadelphia, Pa.
V-Meth-L—Refrigerant. Virginia Smelting Co., West Norfolk, Va.
Voladjuster—Dampers. Barber-Colman Co., Rockford, Ill.
Volcano—Ventilators. Iwan Brothers, South Bend, Ind.
Volocitrol—Louvers, regulators. Barber-Colman Co., Rockford, Ill.
Vornado—Fans. Sutton Corp., O. A., Wichita, Kan.
Vortex—Pumps. Lawrence Pump & Engine Co., Lawrence, Mass.
Vortex—Nozzles. Phillips Cooling Tower Co., Inc., New York, N. Y.
V-to-V—Pulleys and sheaves. Dayton Rubber Co., Dayton, O.
Vulcalock—Fittings, pipe, tanks, valves. Goodrich Co., B. F., Akron, O.
Vulcan—Stands, tongs, vises. Williams & Co., J. H., Buffalo, N. Y.
Vulcan—Stokers. Canton Stoker Corp., Canton, O.
Vulcan Superior—Tongs, vises. Williams & Co., J. H., Buffalo, N. Y.
Vulco—Belts, drives, pulleys. Gates Rubber Co., Denver, Colo.
Vulco Mount—Pulleys. Gates Rubber Co., Denver, Colo.
Vynal—Coatings. Watson-Standard Co., Pittsburgh, Pa.
Vyncote—Coatings. Watson-Standard Co., Pittsburgh, Pa.

W. & McD.—Strainers. Watson & McDaniel Co., Philadelphia, Pa.
W-S—Fittings. Watson-Stillman Co., Roselle, N. J.

W & T—Anemometers, feeders, gages, indicators, hygrometers, dew point recorders, meters, relays. Wallace & Tiernan Co., Inc., Newark, N. J.
W & W—Pipe hangers. Western Wire Products Co., St. Louis, Mo.
Walco-Parmelee — Wrenches. Walworth Co., New York, N. Y.
Walltube—Radiator brackets. Arjac Products Inc., Rochester, N. Y.
Walseal Silbraz—Fittings, valves. Walworth Co., New York, N. Y.
Walvector—Radiations. Webster & Co., Warren, Camden, N. J.
Warco — Combustion chambers, refractories. Walsh Refractories Corp., St. Louis, Mo.
Warco—Valves. Bridgeport Brass Co., Bridgeport, Conn.
Wat-a-mat—Water meters. Pfening Co., Fred D., Columbus, O.
Watco—Cooling towers, humidifiers, spray nozzles, spraying systems. Water Cooling Corp., New York, N. Y.
Water-Boy—Feeders. Maid-O'-Mist, Inc., Chicago, Ill.
Water-King—Pumps. Peerless Pump Div., Food Machinery and Chemical Corp., Los Angeles, Calif.
Water-Maker—Water heaters. Catskill Metal Works, Inc., Catskill, N. Y.
Waterspar—Enamels and laquers. Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Watrola—Water heaters. George E. Swett & Co., San Francisco, Calif.
Way Loctor—Doors and panels. Walsh, The, L. M., Co., Boston, Mass.
Wear-Proof—Pumps. Schneible Co., Claude B., Detroit, Mich.
Wearweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Weather-Chron—Time switches. Automatic Devices Co., Inc., Chicago, Ill.
Weathermaker—Unit coolers, unit air conditioners. Carrier Corp., Syracuse, N. Y.
Weather-Man—Regulators, switches, thermostats. Automatic Devices Co., Inc., Chicago, Ill.
Weathermaster—Unit air conditioners. Carrier Corp., Syracuse, N. Y.
Weatherstat—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Weatherwood—Insulation. United States Gypsum Co., Chicago, Ill.
Webco—Brakes. Webb Machine & Tool Co., Pittsburgh, Pa.
Webster-Nesbitt—Unit heaters. Webster & Co., Warren, Camden, N. J.
Webster-Nesbitt "Little Giant"—Unit heaters. Nesbitt, Inc., John J. Philadelphia, Pa.
Weco—Gas burners. Webster Engineering Co., Tulsa, Okla.
Wedgbelt—V belts and v-belt drives, pulleys. American Pulley Co., Philadelphia, Pa.
Weir—Stokers. Meyer Furnace Co., The, Peoria, Ill.
Weiralead—Lead alloy coated sheets. Weirton Steel Co., Weirton, W. Va.
Weir-Mayer—Furnaces. Meyer Furnace Co., The, Peoria, Ill.
Weirzin—Electrolytic zinc coated sheets. Weirton Steel Co., Weirton, W. Va.
Weldells—Welding fittings. Taylor Forge & Pipe Works, Chicago, Ill.
Weldolets—Fittings. Bonney Forge & Tool Works, Allentown, Pa.
WesCo—Solenoids. West Coast Electric Mfg. Co., Los Angeles, Calif.
Western—Fans, furnaces, heaters. International Sales Co., San Francisco, Calif.
Westernaire—Fans. Western Engineering & Mfg. Co., Los Angeles, Calif.
Western Rotary—Ventilators. Western Engineering & Mfg. Co., Los Angeles, Calif.
Westo—Water treatment. Western Chemical Co., Kansas City, Mo.
Whirlcone — Spray nozzles. Water Cooling Equipment Corp., St. Louis, Mo.
Whirljet—Spray nozzles. Spraying Systems Co., Bellwood, Ill.
Whisper-Quiet—Heaters. Zink Co., John, Tulsa, Okla.
Whitson—Steam traps. Healy Ruff Co., St. Paul, Minn.
Whiz—Drills. Paramount Products Co., New York, N. Y.
Wilco—Bi-metals. Wilson Co., H. A., The, Newark, N. J.
Wilco—Pipe cutting machines. Oster Mfg. Co., Cleveland, O.
Williams-Hager—Valves. Williams Gauge Co., The, Pittsburgh, Pa.
Wilmington—Air compressors. Electric Sprayit Co., The, Sheboygan, Wis.
Windmotor—Roof ventilators. Airecon Industries, Detroit, Mich.
Wind-O-Cool—Fans. Belter Electric Mfg. Co., G. J., The, St. Louis, Mo.
Wind-O-Vent—Window ventilator and filter units. Reed Unit-Fans, Inc., New Orleans, La.
Wingfoil—Ventilators. Wing Mfg. Co., L. J., New York, N. Y.
Winkler—Burners, stokers. U. S. Machine Corp., Lebanon, Ind.
Winter-Chaser—Air conditioning units, furnaces, heaters. Campbell Heating Co., Des Moines, Ia.
Wissco—Grilles. Wickwire Spencer Steel Div. of Colorado Fuel & Iron Corp., Buffalo, N. Y.
Witch—Bolts, clamps, hangers, protectors. Carpenter & Paterson, Inc., East Boston, Mass.
Wolf-Linde—Compressors, condensers, fittings, valves. Dersch, Gesswein & Neurt, Inc., Chicago, Ill.
Wolverine—Heat exchangers, unit heaters, air conditioning units. Airecon Industries, Detroit, Mich.
Wonder—Tubing benders. American Pipe Bending Machine Co., Inc., Poultney, Vt.
Workhorse—Motors. Crozier Machine Tool Co., Hawthorne, Calif.

X-L — Gaskets, packing. Excelsior Leather Washer Co., Rockford, Ill.
Xacto—Meters. Bowser, Inc., Fort Wayne, Ind.
"X" Boilerliquid—Compounds. X Laboratories, Inc., New York, N. Y.
"X" Flush-Rustoff—Boiler cleaning compounds. X Laboratories, Inc., New York, N. Y.
"X" Pipejoin—Cement and compounds. X Laboratories, Inc., New York, N. Y.
Xit—Ventilators. Iona Ventilator Co., Inc., Philadelphia, Pa.

Yager's—Solder. Benson Co., Inc., Alex R., Hudson, N. Y.
Yarway—Alarms, clamps, expansion joints, recorders, nozzles, strainers, traps, valves. Yarnall-Waring Co., Philadelphia, Pa.
Yellow-Jacket—Heating boilers. Burnham Corp., Boiler Div., Irvington, N. Y.
Yemco—Water heaters. York Electric & Machine Co., York, Pa.
Yoloy—Pipe, sheet, tubing. Youngstown Sheet & Tube Co., Youngstown, O.
Yorkaire—Unit air coolers. York Corp., York, Pa.
York-Power—Oil burners. York-Shipley, Inc., York, Pa.

Zapon—Enamels and lacquers. Atlas Powder Co., North Chicago, Ill.
Z-Crete—Pipe insulation. Zonolite Co., Chicago, Ill.
Zero—Cement, refractories. Standard Fuel Engineering Co., Detroit, Mich.
Zerolite—Insulation. Johns-Manville, New York, N. Y.
Zig Zag—Heat exchangers. Stout & Sons, David, St. Louis, Mo.
Zincgrip—Sheets. Armco Steel Corp., Middletown, O.
Zincilate—Coatings. Industrial Metal Protectives, Inc., Dayton, O.
Zinc Soot—Soot destroyers. Tamms Industries, Inc., Chicago, Ill.
Zircon—Furnace and refractory cement, refractories. Taylor Sons Co., Charles, Cincinnati, O.
Zone-Master—Heating systems. W-H Engineering Co., Chicago, Ill.
Zone-Pac—Heating systems. Barber-Colman Co., Rockford, Ill.

DIRECTORY SECTION
HEATING, PIPING, AND AIR CONDITIONING EQUIPMENT FOR INDUSTRY AND LARGE BUILDINGS

PART 3—MANUFACTURERS' ADDRESSES

A

A. & A. Register Co., 8327 Clinton Rd., Cleveland 9, O.
● A-J Mfg. Co., 2119 Washington St., Kansas City, Mo.
Acadia Synthetic Products Div., Western Felt Works, 4115 Ogden Ave., Chicago, Ill.
Accurate Sheet Metal Mfg. Works, 2336-40 Milwaukee Ave., Chicago 47, Ill.
Ace Electric Corp., Bedford, Ind.
Ace Engineering Co., 1435 W. 15th St., Chicago 8, Ill.
Acer & Whedon, Inc., Medina, N. Y.
Acheson Mfg. Co., Braddock P. O., Rankin, Pa.
Acker Organization, Inc., W. M., 3167 Fulton Rd., Cleveland 9, O.
Ackermann Mfg. Co., Wheeling, W. Va.
Acme Asbestos Covering & Flooring Co., 236 N. Elizabeth St., Chicago 7, Ill.
Acme Electric Welder Co., 2618 Fruitland Rd., Los Angeles 11, Calif.
Acme Equipment Co., 205-13 E. Broadway, Muskogee, Okla.
● Acme Industries, Inc., Cor. Mechanic and Ganson Sts., Jackson, Mich.
Acme Mfg. Co., State Rd. below Rhawn St., Holmesburg, Philadelphia 36, Pa.
Acme Refining Co., The, W. 56th & W. & L. E. Ry., Cleveland, O.
Acme Steel Co., 2840 Archer Ave., Chicago 8, Ill.
Acme White Lead & Color Works, 8250 St. Aubin Ave., Detroit 11, Mich.
Acorn Refining Co., 8001 Franklin Ave., Cleveland, O.
Acro Switch Co., 2030 E. Main St., Columbus 9, O.
Acro Welder Mfg. Co., 1825 W. St. Paul Ave., Milwaukee 3, Wis.
Acrow, Inc., 155 Washington St., Newark, N. J.
Actus Corp., Mount Vernon, N. Y.
Adam Electric Co., Frank, 3650 Windsor St., St. Louis, Mo.
Adams Co., The, E. 4th St., P. O. Box 268, Dubuque, Ia.
Adams Co., Inc., R. P., 225-7 E. Park Dr., Buffalo 17, N. Y.
Adelta Mfg. Co., Inc., 21 & Ellsworth, Philadelphia 46, Pa.
Advance Aluminum Castings Corp., 2742 W. 36th Pl., Chicago 32, Ill.
Advance Electric & Relay Co., 1260 W. Second St., Los Angeles 26, Calif.
Advance Fan & Blower Co., 3428 Bagley, Detroit, Mich.
● Aerofin Corp., 410 S. Geddes St., Syracuse 1, N. Y.
Aeroil Products Co., Inc., Wesley St., South Hackensack, N. J.
Aeroquip Corp., 300 S. East Ave., Jackson, Mich.
Aerotec Corp., The, Greenwich, Conn.
Aerovent Fan Co., Inc., 710 E. Ash St., Piqua, O.
Agaloy Tubing Co., Springfield, O.
Aget-Detroit Co., 613 First National Bank Bldg., Ann Arbor, Mich.
Agnew Electric Co., Milford, Mich.
Agnew & Tomlinson, 10-26 Jackson Ave., Long Island City 1, N. Y.
Ahlberg Bearing Co., 3081 W. 47th St., Chicago 32, Ill.
● Air Conditioning Products Co., 2340 W. Lafayette Blvd., Detroit 16, Mich.
Air Control Products, Inc., Coopersville, Mich.
Air Controls, Inc., Div. of Cleveland Heater Co., 2310 Superior Ave., Cleveland 14, O.
Air Correctives Inc., 441 Lexington Ave., New York 17, N. Y.
● Air Devices, Inc., 17 E. 42nd St., New York 17, N. Y.
Air Equipment Co., 1713 W. Carroll Ave., Chicago 12, Ill.
Air Equipment Co., 2730 Zuni St., Denver, Colo.
Air Filter Corp., 108 N. Water St., Milwaukee 2, Wis.
Air Purification Service, Inc., 82 Plane St., Newark 2, N. J.
Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y.
● Air & Refrigeration Corp., 475 Fifth Ave., New York 17, N. Y.
Airecon Industries, 2536 14th St., Detroit 16, Mich.
Aire-Foile Fan & Blower Co., 2909 Central Ave., Detroit 9, Mich.
Airgard Mfg. Co., 362 W. Erie St., Chicago 10, Ill.
Airjet Ventilator Co., 380 Plumosa Dr., Pasadena 10, Calif.
Airkem, Inc., 7 East 47th St., New York, N. Y.
Airmaster Corp., 4317 Ravenswood Ave., Chicago 13, Ill.
● Air-Maze Corp., 5200 Harvard Ave., Cleveland 5, O.
Air-O-Cel Co., 22000 Woodward Ave., Detroit 20, Mich.
Air-Stream Filter Corp., 2100 Washington Ave., St. Louis 3, Mo.
Airtemp, Div. of Chrysler Corp., 1600 Webster St., Dayton 1, O.
Airtherm Mfg. Co., 711 S. Spring Ave., St. Louis 10, Mo.
Airwasher Corp., 1122 N. Washington Ave., Lansing, Mich.
Ajax Flexible Coupling Co., Westfield, N. Y.
Ajax Furnace Fitting Co., Div. of Cincinnati Sheet Metal & Roofing Co., 216-220 E. Front St., Cincinnati 2, O.
Akron Metallic Gasket Co., 155 N. Union, P. O. Box 911, Akron 9, O.
Akwa Heaters, Inc., 1955 Park Ave., New York 35, N. Y.
Alabama Pipe Co., Anniston, Ala.
Aladdin Heating Corp., 2222 San Pablo Ave., Oakland 12, Calif.
Albertson & Co., Inc., Sioux City 3, Ia.
● Alco Valve Co., 861 Kingsland Ave., St. Louis 5, Mo.
● Aldrich Co., The, 105 Williams St., Wyoming, Ill.
Aldrich Pump Co., 4 Pine St., Allentown, Pa.
Alert Engineering Products, 315 W. Woodbridge St., Detroit 26, Mich.
Alexander Bros., 406 N. 3rd, Philadelphia, Pa.
Alfol Insulation Co., Inc., 155 E. 44th St., New York 17, N. Y.
All-State Welding Alloys Co., Inc., White Plains, N. Y.
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa.
Allan Engineering Co., P. O. Box 1211, Dallas, Tex.
Allen Billmyre Div., Lamson Corp., Syracuse 1, N. Y.
● Allen-Bradley Co., 1335 S. First St., Milwaukee 4, Wis.
Allen Co., Inc., L. B., 6702 Bryn Mawr Ave., Chicago 31, Ill.
Allen Co., Robert G., P. O. Box 110, Mechanicsville, N. Y.
Allen Ventilator Div., Production Planning Co., 704 Woodward, Rochester, Mich.
Alliance Industries, Huntingden Valley, Pa.
● Alliance Mfg. Co., Alliance, O.
Allied Control Co., Inc., 2 East End Ave., New York, N. Y.
Allied Weld-Craft, Inc., 401 W. South St., Indianapolis 4, Ind.
Allington & Curtis Mfg. Co., 1800 Holland Ave., Saginaw, Mich.
● Allis-Chalmers Mfg. Co., 1171 S. 70th St., Milwaukee 1, Wis.
Allis Co., Louis, The, 427 E. Stewart St., Milwaukee 7, Wis.
Alloy Steel Products Co., 1506 W. Elizabeth Ave., Linden, N. J.
Allpax Co., Inc., Mamaroneck, N. Y.
Alpha Metals, Inc., 363 Hudson Ave., Brooklyn 1, N. Y.
Alphil Spot Welding Co., 1058 Pacific St., Brooklyn, N. Y.
Alrose Chemical Co., Box 1294, Providence 1, R. I.
Alsoco Corp., 10 E. 52nd St., New York, N. Y.
Altens Foundry & Machine Works, Inc., 226 W. Wheeling St., Lancaster, O.
● Alton Mfg. Co., 1112 Ross Ave., Dallas 2, Tex.
Alton Mineral Wool Insulation Co., 2317 Whittemore Pl., St. Louis 4, Mo.
Aluminum Co. of America, 801 Gulf Bldg., Pittsburgh 19, Pa.
Amercoat Div., American Pipe & Construction Co., 4809 Firestone Blvd., South Gate, Calif.
American Agile Corp., 5806 Hough Ave., Cleveland 3, O.
American Air Conditioning Co., Boulevard Bldg., Detroit, Mich.
● American Air Filter Co., Inc., 373 Central Ave., Louisville 8, Ky.
● American Blower Corp., Detroit 32, Mich.
American Brass Co., 414 Meadow St., Waterbury 20, Conn.
American Car & Foundry Co., 30 Church St., New York 8, N. Y.
American Cast Iron Pipe Co., 2930 N. 16th St., Birmingham 2, Ala.
American Chemical Paint Co., Brookside Ave., Ambler, Pa.
American Coal Burner Co., 12-20 E. Erie St., Chicago 11, Ill.
American Coils Co., 360 Thomas St., Newark 5, N. J.
American Coolair Corp., 3604 Mayflower St., P. O. Box 2300, Jacksonville 3, Fla.
American Cooling Tower Co., 2710 McGee St., Kansas City 8, Mo.
American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, New York, N. Y.
American Die & Tool Co., Inc., 3rd & Greenwich Sts., Reading, Pa.
● American District Steam Co., 25 Bryant St., North Tonawanda, N. Y.
American District Telegraph Co., 155 Sixth Ave., New York, N. Y.
American Engineering Co., Aramingo Ave. and Cumberland St., Philadelphia 25, Pa.
American Felt Co., Glenville, Conn.
American Flange & Mfg. Co., Inc., 30 Rockefeller Plaza, New York 20, N. Y.
American Flexible Coupling Co., 1801 Pittsburgh Ave., Erie, Pa.
American Foundry & Furnace Co., Washington St. at McClun, Bloomington, Ill.
American Furnace Co., 2719-31 Delmar Blvd., St. Louis 3, Mo.
American Gas Accumulator Co., 1027 Newark Ave., Elizabeth 3, N. J.
American Hair & Felt Co., 1828 Merchandise Mart, Chicago 54, Ill.
American Hard Rubber Co., 11 Mercer St., New York 13, N. Y.
American Heat Corp., 1044 Little Bldg., Boston, Mass.
American Hydrovac Inc., 290 Scholes St., Brooklyn 6, N. Y.
American Injector Co., 1481-14th St., Detroit 16, Mich.
American Instrument Co., Silver Spring, Md.
American K. A. T. Corp., 331 Madison Ave., New York 17, N. Y.
American-Larson Ventilation Co., 1004 Keystone Bank Bldg., Pittsburgh 22, Pa.
American Locomotive Co., Alco Products Div., 30 Church St., New York 8, N. Y.
American Locomotive Co., Diesel Engine Div., Auburn, N. Y.
American Machine Products Co., 401 S. Third Ave., Marshalltown, Ia.
American Machine Wks., Inc., Racine, Wis.
American Manganese Bronze Co., Rhawn & Hegerman Sts., Philadelphia, Pa.
American-Marietta Co., 43 E. Ohio St., Chicago 11, Ill.
American-Marsh Pumps, Inc., 60 Capital Ave., N. E., Battle Creek, Mich.
American Metal Hose Branch, American Brass Co., The, 698 S. Main St., Waterbury 20, Conn.
American Meter Co., Inc., 60 E. 42nd St., New York 17, N. Y.

● Advertisement in this issue. See Index to Advertisers, page 120d

American Moistening Co., 260 W. Exchange St., Providence, R. I.
American Nickeloid Co., 113 Second St., Peru, Ill.
American Photocopy Equipment Co., 2849 N. Clark St., Chicago 14, Ill.
American Pipe Bending Machine Co., Inc., 17 Furnace St., Poultney, Vt.
American Pipe Tool Co., 4856 W. Kinzie St., Chicago 44, Ill.
American Pipe & Steel Corp., 2201 W. Commonwealth Ave., Alhambra, Calif.
American Pulley Co., The, 4200 Wissahickon Ave., Philadelphia 29, Pa.
● American Radiator & Standard Sanitary Corp., P. O. Box 1226, Pittsburgh 30, Pa.
American Screw Co., 21 Stevens St., Providence, R. I.
American Sheet Metal Works, 331 N. Alexander, New Orleans, La.
American Shipbuilding Co., Ft. W. 54th St., Cleveland 2, O.
American Solder & Flux Co., 2152 E. Norris St., Philadelphia 25, Pa.
American Steel Band Co., P. O. Box 565, Pittsburgh, Pa.
American Steel & Wire Co., United States Steel Corp. Subsidiary, Rockefeller Bldg., Cleveland 13, O.
American Sterilizer Co., Erie, Pa.
American Thermal Industries, Inc., 440 Illinois, Detroit 1, Mich.
American Ventilating Hose Co., 15 Park Row, New York 7, N. Y.
American Warming & Ventilating Co., 1017-1021 Summit St., Toledo 4, O.
American Water Softener Co., Lehigh Ave. and 4th St., Philadelphia 33, Pa.
American Welding & Mfg. Co., Griswold St., N. E., Warren, O.
American Well Wks., 100 N. Broadway, Aurora, Ill.
American Wheelabrator & Equipment Corp., 619 S. Byrkit St., Mishawaka, Ind.
American Zinc Products Co., Greencastle, Ind.
● Ames Iron Works, Div. of Pierce Butler Radiator Corp., Oswego, N. Y.
Aminco Refrigeration Products Co., 14544 Third Ave., Detroit 3, Mich.
Ammco Tools, Inc., North Chicago, Ill.
Ammerman Co., C. L., Metropolitan Life Bldg., Minneapolis, Minn.
Amp Corp., 2921 Locust St., St. Louis, Mo.
Ampion Corp., 4-88 47th Ave., Long Island City 1, N. Y.
Anchor Packing Co., 401 N. Broad St., Philadelphia 8, Pa.
Andale Co., 1740 Cherry St., Philadelphia 3, Pa.
Andersen Corp., Bayport, Minn.
● Anderson Co., V. D., The, 1949 W. 96th St., Cleveland 2, O.
Anderson Diesel Engine Co., 6245 State Rd., Philadelphia 35, Pa.
Anderson Products, Inc., 17 Tudor St., Cambridge 39, Mass.
Anderson-Stolz Corp., 1731 Walnut St., Kansas City 8, Mo.
● Anemostat Corp. of America, 10 E. 39th St., New York 16, N. Y.
Anetsberger Bros., Inc., Northbrook, Ill.
Ansul Chemical Co., Refrigeration Div., Marinette, Wis.
Anti-Friction Bearings Co., 2020 S. Figueroa St., Los Angeles 7, Calif.
Apex All Weather Products, Engineering Div., 228 N. La Salle St., Chicago 1, Ill.
Apex Engineering Co., 75 E. Wacker Dr., Chicago 1, Ill.
Apollo Steel Co., 609 Warren Ave., Apollo, Pa.
Appleman Glass Works, Bergenfield, N. J.
Applied Mechanics Co., 167 Oliver St., Boston 10, Mass.
● April Showers Co., Inc., 4126 Eighth St., N. W., Washington 11, D. C.
Aqua Electric Scale Control, Inc., 2028 E. 22nd St., Cleveland 15, O.
Aqua-Mist Co., 426 Jefferson St., Topeka, Kans.
Aqua-Sorb Co., 21 S. 16th St., East Orange, N. J.
Aquatic Chemical Laboratories, Inc., 95 Liberty St., New York 6, N. Y.
Arabol Mfg. Co., 110 E. 42nd St., New York 17, N. Y.
Arco Co., 7301 Bessemer Ave, Cleveland 4, O.
Arcos Corp., 1500 S. 50th St., Philadelphia 43, Pa.
Arcweld Mfg. Co., Inc., 3469 Third Ave., W., Seattle 99, Wash.
Arens Controls, Inc., 2267 S. Halsted St., Chicago, Ill.
Arex Co., 333 N. Michigan Ave., Chicago 1, Ill.
Arjac Products Inc., 55-59 Halstead St., Rochester 10, N. Y.
Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
Armco Steel Corp., 461 Curtis St., Middletown, Ohio
Armour Ammonia Works, 1355 W. 31st St., Chicago, Ill.
Armstrong-Blum Mfg. Co., 5700 Bloomingdale Rd., Chicago, Ill.
Armstrong Bros. Tool Co., 5200-5300 W. Armstrong Ave., Chicago 30, Ill.
Armstrong Co., The, 241 S. Post St., Detroit 17, Mich.
Armstrong Co., Richard M., Westchester, Pa.
Armstrong Control Co., Inc., P. O. Box 4637, Portland 2, Ore.
● Armstrong Cork Co., 440 Concord St., Lancaster, Pa.
● Armstrong Machine Wks., 874 Maple St., Three Rivers, Mich.
Armstrong Mfg. Co., 303 Knowlton St., Bridgeport 8, Conn.
Arrow-Hart & Hegeman Elect. Co., 103 Hawthorne St., Hartford 6, Conn.
Arrowhead Rubber Co., 2244 E. 37th St., Los Angeles 11, Calif.
Art Valve Co., 4662 N. Lincoln Ave., Chicago 25, Ill.
Ashton Valve Co., 161-1st St., Cambridge 42, Mass.
Askania Regulator Co., 240 E. Ontario St., Chicago 11, Ill.
Atkins & Co., E. C., 402 S. Illinois St., Indianapolis 9, Ind.
Atlantic Metal Hose Co., Inc., 123 W. 64th St., New York, N. Y.
Atlantic Pipebending & Fabricating Corp., 552 River Rd., Edgewater, N. J.
Atlantic Steel Boiler Co., 24th St. and Brown St., Philadelphia 30, Pa.
Atlantic Steel Co., P. O. Box 1714, Atlanta 1, Ga.
Atlas Chemical Co., Marietta, O.
Atlas Powder Co., Industrial Finishes, North Chicago, Ill.
Atlas Utilities Co., Inc., 17 Exchange St., Providence 3, R. I.
Atlas Valve Co., 282 South St., Newark, N. J.
Atlas Welding Accessories Co., 707 E. Lewistown Ave., Fernadale 20, Mich.
Auburn Burner Co., Lock Box 269, Auburn, Ind.
Auburn Foundry Inc., Stoker Div., Auburn, Ind.
● Auer Register Co., 3608 Payne Ave., Cleveland 14, O.
Aurora Pump Co., 619 Loucks St., Aurora, Ill.
Austin-Mason Co., 6 Ashland St., Everett 49, Mass.
● Autempco Corp., 521 Fifth Ave., New York 17, N. Y.
Autoforce Ventilating System, 244 Washington St., Boston 8, Mass.
Automatic Control Co., 1005 University Ave., St. Paul 4, Minn.
Automatic Devices Co., Inc., 53 W. Jackson Blvd., Chicago 4, Ill.
Automatic Electric Mfg. Co., 10 State St., Mankato, Minn.
Automatic Firing Corp., 6504 Olive Blvd., St. Louis 5, Mo.
Automatic Gas Equipment Co., 301 Brushton Ave., Pittsburgh 21, Pa.
Automatic Products Co., 2460 N. 32nd St., Milwaukee 10, Wis.
Automatic Steel Products, Inc., Div. of Mercury Clutch, Canton 6, O.
Automatic Switch Co., 391 Lakeside Ave., Orange, N. J.
Automatic Temperature Control Co., Inc., 5212 Pulaski Ave., Philadelphia 44, Pa.
● Auto Radiator Specialty Co., 3535 Fillmore St., Chicago 24, Ill.
Autostributor Co., 238 Mill St., Lansing, Mich.
Azor Corp., 107 Montgomery Ave., Irvington, N. J.

B

B & B Tool & Specialty Co., The, 4731 Wilmington Pike, Dayton 9, O.
B & M Mfg. Co., 19 N. Harrison St., East Orange, N. J.
B/W Controller Corp., 2200 E. Maple Ave., Birmingham, Mich.
Babbitt Chemical Specialties Co., 630 Fifth Ave., New York 20, N. Y.
Babcock & Wilcox Co., 85 Liberty St., New York 6, N. Y.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Babcock & Wilcox Tube Co., The, Welded Tube Div., Alliance, O.
Bacharach Industrial Instrument Co., 7000 Bennett St., Pittsburgh 8, Pa.
Bache & Co., Semon Greenwich & Morton Sts., New York 14, N. Y.
Badger Fire Extinguisher Co., 624 Somerville Ave., Somerville 43, Mass.
● Badger Mfg. Co., 260 Bent St., Cambridge 41, Mass.
Badham Insulation Co., Inc., Birmingham, Ala.
Baer Bros., 438 W. 37th St., New York 18, N. Y.
Bahnson Co., 1001 S. Marshall St., Winston-Salem, N. C.
Bailey Co., Chas. M., 667 Folsom St., San Francisco 7, Calif.
Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland 10, O.
Baker & Co., Inc., 113 Astor St., Newark 5, N. J.
Baker Refrigeration Corp., South Windham, Me.
● Baldor Electric Co., 4353 Duncan Ave., St Louis 10, Mo.
Baldwin Belting, Inc., 74-76 Murray St., New York 7, N. Y.
Baldwin-Hill Co., 500 Breunig Ave., Trenton 2, N. J.
Baldwin Locomotive Works, Philadelphia 42, Pa.
Ball Welding Works, Inc., 10154 Edes Ave., Oakland 3, Calif.
Balloffet Dies and Nozzle Co., Inc., 6825 Adams St., Guttenberg, N. J.
● Baltimore Aircoil Co., Inc., 715 - 17 W. Pratt St., Baltimore 1, Md.
Bar-Brook Mfg. Co., Inc., 6133 Linwood Ave., Shreveport, La.
Barber-Colman Co., 1228 Rock St., Rockford, Ill.
Barber Gas Burner Co., 3704 Superior Ave., Cleveland 14, O.
Barclay, Inc., Robert, 128 N. Peoria St., Chicago, Ill.
Barco Mfg. Co., Not Inc., 1801 Winnemac Ave., Chicago 40, Ill.
Bargar Sheet Metal Co., 12401 Euclid St., Cleveland, O.
● Barnes & Jones, Inc., 128 Brookside Ave., Jamaica Plain, Boston 30, Mass.
Barnes Manufacturing Co., Mansfield, O.
Barnes Tool Co., The, 152 Brewery St., New Haven 6, Conn.
Barrett Div., The, Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.
Barrett, Haentjens & Co., Hazleton, Pa.
Barrett Machine Co., 912-916 Behan St., N. S., Pittsburgh 12, Pa.
Bart Mfg. Co., Inc., 227 Main St., Belleville 9, N. J.
Barth Mfg. Co., Milldale, Conn.
Bartlett Hayward, Div. of Koppers Co., 200 Scott St., Baltimore, Md.
Bartlett Mfg. Co., 3003 E. Grand Blvd., Detroit 2, Mich.
Barton Co., 118 S. Eighth St., Minneapolis, Minn.
Barton Instrument Co., 1429 S. Eastern Ave., Los Angeles 22, Calif.
Barwick Mfg. Corp., 317 E. 18th, Wichita, Kan.
Basic Refractories, Inc., 845 Hanna Bldg., Cleveland 15, O.
Bastian-Morley Co., Inc., LaPorte, Ind.
Bath Co., Cyril, The, E. 70th and Machinery Ave., Cleveland 3, O.
Bausch & Lomb Optical Co., 635 St. Paul St., Rochester 2, N. Y.
Bayer Co., 4030 Chouteau Ave., St. Louis 10, Mo.
Bayley Blower Co., 1817 S. 66th St., Milwaukee 14, Wis.
Beach-Russ Co., 64A Church St., New York, N. Y.
Beacon-Morris Corp., 60 Brainerd Rd., Allston, Boston 34, Mass.
Bear Mfg. Co., Industrial Div., Rock Island, Ill.
Bearings Co. of America, 501 Harrisburg Ave., Lancaster, Pa.
Bearlee Products Co., 1255 S. Monroe, Green Bay, Wis.
Beaton & Cadwell Mfg. Co., 185 Main St., New Britain, Conn.
Beaton & Corbin Mfg. Co., Southington, Conn.
Beaver Pipe Tools, Inc., 310 Dana Ave., Warren, O.
Beck Engineering Combustion Kompany, 2100 Cole St., St. Louis 6, Mo
Beckett & Co., Inc., Thomas, 2001 Willowbrook Rd., P. O. Box 7354, Dallas 2, Tex.
Beckley Perforating Co., 301 North Ave., Garwood, N. J.
Belfield Valve Div. of Minneapolis-Honeywell, 435 N. Broad St., Philadelphia 23, Pa.
Belknap Mfg. Co., 800 Union Ave., Bridgeport 1, Conn.
● Bell & Gossett Co., Morton Grove, Ill.
Bellows Co., 222 W. Market St., Akron 9, O.
Belmont Packing & Rubber Co., The, Butler & Sepviva Sts., Philadelphia 37, Pa.
Belmont Smelting & Refining Wks., Inc., 349 Belmont Ave., Brooklyn 7, N. Y.
Belter Electric Mfg. Co., G. J., The, 3830-32 Olive St., St. Louis 8, Mo.
● Bendix Aviation Corp., Eclipse-Pioneer Div., Metal Hose Dept., Teterboro, N. J.
Benjamin Air Rifle Co., 1527 S. 8th St., St. Louis 4, Mo.
Benjamin Electric Mfg. Co., Des Plaines, Ill.
Bennett Oil Co., 964 S. Saddle Creek Rd., Omaha 6, Neb.
Benson Co., Inc., Alex R., 1040 Bay Rd., So., Hudson, N. Y.
Berger Bros. Co., 229-237 Arch St., Philadelphia 6, Pa.
Berger Mfg. Div., Republic Steel Corp., 1038 Belden Ave., Canton 5, O.

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Bern's Mfg. Co., 2278 N. Elston Ave., Chicago, Ill.
Bernz Co., Otto, 280 Lyell Ave., Rochester 6, N. Y.
Bertsch & Co., Inc., Church St., Cambridge City, Ind.
Best Combustion Equipment Co., Inc., W. N., 90 West St., New York, N. Y.
Best Register Co., 2005 W. Oklahoma Ave., Milwaukee 7, Wis.
Bete Fog Nozzle Co., Greenfield, Mass.
Bethlehem Foundry & Machine Co., W. Second St., Bethlehem, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Betz Corp., 460 State St., Hammond, Ind.
Beverly Shear Mfg. Co., 3013 W. 110th Pl., Chicago 43, Ill.
Biersach & Niedermeyer Co., 1937 N. Hubbard St., Milwaukee 12, Wis.
Bigelow Co., 174 River St., New Haven 3, Conn.
Biggs Boiler Wks. Co., The, Case Ave. and B. & O. R. R., E. Akron 5, O.
Bignall & Keeler Div., John Ramming Machine Co., 4591 McRee Ave., St. Louis 10, Mo.
Billings & Spencer Co., 1 Laurel St., Hartford 1, Conn.
Binks Mfg. Co., 3114-40 Carroll Ave., Chicago 12, Ill.
Birchfield Boiler, Inc., 2503 E. 11th St., Tacoma 1, Wash.
Bird-Archer Co., 4337 North American St., Philadelphia 40, Pa.
● Bishop & Babcock Mfg. Co., 4901 Hamilton Ave., Cleveland 14, O.
Black & Decker Mfg. Co., 628 Pennsylvania Ave., Towson 4, Md.
Black Magic Products Co., P. O. Box 1703, Tulsa, Okla.
Black Mfg. Co., The, 1426 W. Baltimore St., Baltimore 23, Md.
Black-Sivalls & Bryson, Inc., 7501 E. 10th St., Kansas City 3, Mo.
Blackburn-Smith Mfg. Co., River St., Hoboken, N. J.
Blackhawk Mfg. Co., 5325 W. Rogers St., Milwaukee 1, Wis.
Blackmer Pump Co., 1920A Century Ave., S. W., Grand Rapids 9, Mich.
Blaisdell Compressor Co., 227 Fulton St., New York, N. Y.
Blazer, M., & Son, 173 Market St., Passaic, N. J.
Bliss Co., E. W., 450 Amsterdam Ave., Detroit 2, Mich.
Blocksom & Co., E. 5th St., Michigan City, Ind.
Blood Brothers Machine Co., Div. of Standard Steel Spring Co., Allegan, Mich.
Blower Application Co., 3165 N. 30th St., Milwaukee 10, Wis.
Blue Ridge Talc Co., Inc., Henry, Va.
Blue Seal Chemical Co., 177 Westfield Ave., W., Roselle Park, N. J.
Bodine Electric Co., 2254 W. Ohio St., Chicago 12, Ill.
Bogue Electric Co., 37 Kentucky Ave., Paterson 3, N. J.
Bohn Aluminum & Brass Corp., 2306 Franklin St., Detroit, Mich.
Boiler Room Equipment Inc., 381 Fourth Ave., New York 16, N. Y.
Bonafide Genasco, Inc, 295 Fifth Ave., New York 16, N. Y.
● Bonney Forge & Tool Wks., 350 Green St., Allentown, Pa.
Bordo Co., Inc., L. J., 115 New St., Glenside, Pa.
Borg-Erickson Corp., 469 E. Ohio St., Chicago 11, Ill.
Borm Mfg. Co., 23 N. Union St., Elgin, Ill.
Boston Auto Gage Co., 70 West St., Pittsfield, Mass.
Boston Gear Works, Inc., North Quincy, Mass.
Boston Woven Hose & Rubber Co., 29 Hampshire St., Cambridge, Mass.
Botfield Refractories Co., Swanson & Clymer Sts., Philadelphia 47, Pa.
Bowen Engineering, Inc., North Branch, N. J.
Bowser, Inc., 1302 E. Creighton Ave., Fort Wayne 2, Ind.
Boylston Steam Specialty Co., 116-122 W. Illinois St., Chicago, Ill.
Brabender Corp., Rochelle Park, N. J.
Bradfield, Jos. L., 10 N. Senate Ave., Indianapolis, Ind.
Brady Co., W. H., 808 N. Third St., Milwaukee 3, Wis.
● Breidert Co., G. C., 3129 San Fernado Rd., Los Angeles 65, Calif.
Bremil Mfg. Co., 1204 Pittsburgh Ave., Erie, Pa.
Bridgeport Brass Co., 30 Grand St., Bridgeport 2, Conn.
Bridgeport Thermostat Div., Robertshaw-Fulton Controls Co., Connecticut Ave., Bridgeport 1, Conn.
Bristol Co., The, P. O. Box 1790, Waterbury 91, Conn.
Broan Mfg. Co., Inc., 1669 N. Water St., Milwaukee 2, Wis.
Brockway Co., 361 Church St., Naugatuck, Conn.
Bronson Mfg. Co., 1237 Riverside Dr., Los Angeles 31, Calif.
Brooke Engineering Co., Inc., 4517 Wayne Ave., Philadelphia 44, Pa.
Brookfield Engineering Laboratories, Inc., 2 Porter St., Stoughton, Mass.
Brooklyn Varnish Mfg. Co., 50 Jay St., Brooklyn 1, N. Y.
Brooks Equipment Corp., 217 Hudson St., Hoboken, N. J.
Bros Boiler & Mfg. Co., Wm., 1057 Tenth Ave., S. E., Minneapolis 14, Minn.
Brown-Brockmeyer Co., Inc., P. O. Box 976, Dayton 1, O.
Brown Co., 500 Fifth Ave., New York, N. Y.
Brown-Electro Co., 17 N. Dewey, Oklahoma City 2, Okla.
Brown Fintube Co., The, Elyria, O.
Brown Instruments Div., Minneapolis-Honeywell Regulator Co., 4534 Wayne Ave., Philadelphia 44, Pa.
Brown Products Co., 96-08 72nd Ave., Forest Hills, N. Y.
● Brownell Co., 408 N. Findlay St., Dayton 1, O.
Browning Mfg. Co. Inc., 1940 Browning Blvd., Maysville, Ky.
● Prundage Co., The, 503 N. Park St., Kalamazoo 11, Mich.
Bruning Co., Inc., Charles, 4754 Montrose Ave., Chicago 41, Ill.
● Brunner Mfg. Co., 1821 Broad St., Utica 1, N. Y.
Bryan Steam Corp., P. O. Box 337, Peru, Ind.
Bryant Corp., C. L., 4610 St. Clair Ave., Cleveland 3, O.
Bryant Heater Div., Affiliated Gas Equipment Co., Inc., 17825 St. Clair Ave., Cleveland 10, O.
Bubar, Hudson H., Old Lyme, Conn.
Buckeye Tools Corp., 29 W. Apple St., Dayton 1, O.
Buda Co., Harvey, Ill.
Buffalo Bolt Co., North Tonawanda, N. Y.
● Buffalo Forge Co., 171 Mortimer St., Buffalo 5, N. Y.
Buffalo Meter Co., 2917 Main St., Buffalo 14, N. Y.
● Buffalo Pumps, Inc., 171 Mortimer St., Buffalo 5, N. Y.
Buffalo Tank Corp., 744 Broad St., Newark 2, N. J.
Buflovac Equipment Div. of Blaw-Knox Co., 50 Winchester Ave., Buffalo 11, N. Y.
Builders-Providence, Inc., Div. of Builders Iron Foundry, 9 Codding St., Providence 1, R. I.
Bump Pump Co., La Crosse, Wis.
● Bundy Tubing Co., 8109 E. Jefferson Ave., Detroit 14, Mich.
Burden Div. of Torrington Mfg. Co., 1000 N. Orange Dr., Los Angeles 38, Calif.
Burke Electric Co., Div. of Marathon Electric Mfg. Corp., 1201 W. 12th St., Erie, Pa.
Burke Stoker & Mfg. Co., 921 W. 19th St., Chicago, Ill.
Burling Instrument Co., Air Conditioning Div., 253 Springfield Ave., Newark 3, N. J.
Burnham Corp., Boiler Div., Main St., Irvington, N. Y.
Burnley Battery & Mfg. Co., 103 Clay St., North East, Pa.
Burrows Mfg. Co., F. A., 318 E. Poplar St., York, Pa.
Burt Mfg. Co., 41 E. South St., Akron 11, O.
Bury Compressor Co., 18th & Cascade Sts., Erie, Pa.
● Bush Mfg. Co., 179 South St., West Hartford, Conn.
Byers Co., A. M., Clark Bldg., Pittsburgh 22, Pa. .

C

CCA Products, Inc., P. O. Box 671, Glendale 5, Calif.
C & H Air Conditioning Fan Co., Inc., 1603 DeKalb Ave., N. E., Atlanta 6, Ga.
Cabot, Inc., Samuel, 141 Milk St., Boston 9, Mass.
Calbar Paint & Varnish Co., 2612-26 N. Martha St., Philadelphia 25, Pa.
Caldwell Co., W. E., 2120 Brook St., Louisville, Ky.
Calgon, Inc., Hagan Bldg., Pittsburgh 30, Pa.
California Brass Mfg. Co., 1447 Naud St., Los Angeles 12, Calif.
Callahan Can Machine Co., Inc., 80 Richard St., Brooklyn, N. Y.
Caloroil Burner Corp., 850 Windsor St., Hartford 5, Conn.
Camloc Fastener Corp., 420 Lexington Ave., New York 17, N. Y.
Campbell Co., J. A., 645 E. Wardlaw Rd., Long Beach 7, Calif.
Campbell Engineering Co., 918 N. Union St., Appleton, Wis.
● Campbell Heating Co., 31st & Dean, P. O. Box 833, Des Moines 4, Ia.
Campbell Heating Co., E. K., 1809 Manchester, Kansas City 3, Mo.
Cam-Stat, Inc., Div. of The Paul Henry Co., 2310 S. LaCienega Blvd., Los Angeles 34, Calif.
Canatsey Electric Mfg. Co., Box 556, Kansas City 8, Mo.
Cannelton Sewer Pipe Co., RadianTile Div., 120 S. LaSalle St., Chicago 3, Ill.
Cannon Chemical Co., Inc., 181 Portland St., Cambridge 41, Mass.
Canton Stoker Corp., 407 Andrew Place, S. W., Canton 1, O.
Canvas Products Co., 1236 S. 7th St., St. Louis 4, Mo.
Capitol Mfg. & Supply Co., 153 W. Fulton St., Columbus, O.
Carbide and Carbon Chemicals Corp., Unit of Union Carbide and Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Carey Electronic Engineering Co., Metal Wool Div., Springfield, O.
Carey Mfg. Co., Philip, Wayne Ave., Lockland, Cincinnati 15, O.
Cargocaire Engineering Corp., 15 Park Row, New York 7, N. Y.
Carling Turbine Blower Co., 25 St. John's Rd., Worcester 3, Mass.
● Carnegie-Illinois Steel Corp., United States Steel Corp. Subsidiary, Carnegie Bldg., Pittsburgh 30, Pa.
Carnes, Inc., John R., Greenlawn Ave. & Erie R. R., Lima, O.
Carney Co., Inc., The, Mankato, Minn.
Carolina Aniline & Extract Co., 301 S. Cedar St., Charlotte, N. C.
Carpenter Heating & Stoker Co., 2135 St. Clair Ave., Cleveland 14, O.
Carpenter Mfg. Corp., The, 9523 Detroit Ave., Cleveland 2, O.
Carpenter & Paterson, Inc., 1190 Bennington St., East Boston 2, Mass.
● Carrier Corp., 302 S. Geddes St., Syracuse 1, N. Y.
Carty & Moore Engineering Co., 1150 W. Baltimore Ave., Detroit 26, Mich.
Carver Pump Co., Muscatine, Ia.
Case & Son Mfg. Co., W. A., 33 Main St., Buffalo 3, N. Y.
● Cash Co., A. W., P. O. Box 551, Decatur, Ill.
Cash Valve Mfg. Co., A. W., 6621 E. Wabash Ave., Decatur 80, Ill.
Cashin Co., W. D., 69 A. St., Boston 27, Mass.
Catawissa Valve & Fittings Co., Catawissa, Pa.
Caterpillar Tractor Co., Peoria 8, Ill.
Caton Co., 972 Broad St., Newark 2, N. J.
Catskill Metal Works, Inc., Catskill, N. Y.
Celco Corp., 110 E. 42nd St., New York 17, N. Y.
Celotex Corp., The, 120 S. La Salle Bldg., Chicago 3, Ill.
Cement Lined Pipe Co., 93 Brookline St., Lynn, Mass.
Central Brass Mfg. Co., 2950 E. 55th St., Cleveland 4, O.
Central Die Casting & Mfg. Co., Inc., 2935 W. 47th St., Chicago, Ill.
Central Foundry Co., 386 Fourth Ave., New York 16, N. Y.
Central Rubber & Steel Corp., P. O. Box 420, Findlay, O.
Central States Mfg. Co., Inc., 1200-12 Summit St., Arkansas City, Kan.
Central States Steel Boiler Co., 4649 W. Harrison St., Chicago 44, Ill.
Central Station Steam Co., 2920 E. Woodbridge St., Detroit 7, Mich.
Central Wire & Iron Works, 621 E. Locust St., Des Moines, Ia.
Centrifix Corp., 3029 Prospect Ave., Cleveland 15, O.
Centri-Spray Corp., 14290 Meyers Rd., Detroit 27, Mich.
Century Aircraft Co., 5601 W. Century Blvd., Los Angeles 43, Calif.
● Century Electric Co., 1806 Pine St., St. Louis 3, Mo.
Century Engineering Co., 5529 S. Vermont Ave., Los Angeles 37, Calif.
Century Engineering Corp., 401-431 3rd St., S. E., Cedar Rapids, Ia.
Century Fan & Ventilator Co., 41 Cedar St., Stamford, Conn.
Certain-teed Products Corp., 120 E. Lancaster Ave., Ardmore, Pa.
Certified Flexible Couplings, 369 Lexington Ave., New York 17, N. Y.
Certified Furnace Co., Div. Stainless & Steel Products Co., 1000 Berry Ave., St. Paul 4, Minn.
Chace Co., W. M., 1606 Beard Ave., Detroit 9, Mich.
Chain Belt Co., 1617 W. Bruce, Milwaukee 4, Wis.

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Chamberlin Co. of America, 1254 La Brosse St., Detroit 26, Mich.
Champion Blower & Forge Co., Harrisburg Ave. and Charlotte St., Lancaster, Pa.
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Champion Laboratories, Inc., Meriden, Conn.
Champion Machine & Forging Co., 3695 E. 78th St., Cleveland 5, O.
Chandler Co., 804 First Ave., N. W., Cedar Rapids, Ia.
Chaplin-Fulton Mfg. Co., 5800 Grand Ave., Pittsburgh 25, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Char-Gale Mfg. Co., 4325 Hiawatha Ave., Minneapolis 6, Minn.
Chase Brass & Copper Co., 265 Grand St., Waterbury 20, Conn.
Chase-Shawmut Co., Newburyport, Mass.
Chelsea Fan & Blower Co., Inc., 1206 S. Grove St., Irvington 11, N. J.
Chelsea Metal Stamping Co., 95 8th Ave., New York 11, N. Y.
Chemical Engineering Co., 2800 Logan St., P. O. Box 1076, Dallas 1, Tex.
Cheney Flashing Co., 623 Prospect St., Trenton 5, N. J.
Chicago Belting Co., 113-125 N. Green St., Chicago 7, Ill.
Chicago Blower Corp., 4558 W. Congress St., Chicago 24, Ill.
Chicago Bridge & Iron Co., 332 S. Michigan Ave., Chicago 4, Ill.
Chicago Die Casting Mfg. Co., 2510-14 W. Monroe St., Chicago 12, Ill.
Chicago Expansion Bolt Co., 1338 W. Concord Pl., Chicago 22, Ill.
Chicago Fan & Fin Coil Co., 1937 Walnut St., Chicago 12, Ill.
Chicago Filter Co., Joliet, Ill.
Chicago Fire Brick Co., 1467 N. Elston Ave., Chicago 22, Ill.
Chicago Float Works, Inc., Dept. T., 2330 S. Western Ave., Chicago 8, Ill.
Chicago Furnace Supply Co., 1278 Clybourn Ave., Chicago, Ill.
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Chicago Metal Mfg. Co., 3724 S. Rockwell St., Chicago 32, Ill.
Chicago Nipple Mfg. Co., 1616 S. Laramie Ave., Cicero 50, Ill.
Chicago Pneumatic Tool Co., 6 E. 44th St., New York, N. Y.
● Chicago Pump Co., 2300 Wolfram St., Chicago 18, Ill.
Chicago Seal Co., 20 N. Wacker Dr., Chicago 6, Ill.
Chicago Specialty Mfg. Co., 2954 Lawrence Ave., Chicago 25, Ill.
Chicago Steel Furnace Co., 9326 S. Anthony Ave., Chicago 17, Ill.
Chicago Steel Tank Co., 6400 W. 66th, Chicago 38, Ill.
Chicago-Wilcox Mfg. Co., E. 77th St. and Anthony Ave., Chicago, Ill.
Chiksan Co., Brea, Calif.
Childers Mfg. Co., 625 Yale St., Houston, Tex.
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Cincinnati Metalcrafts Inc., 5000 Brotherton Rd., Cincinnati 9, O.
Cincinnati Shaper Co., Hopple, Garrard and Elam, Cincinnati 25, O.
Cinder Products Corp., 75 Ellenfield St., Providence, R. I.
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Clark Dust Control Co., 210 N. Mozart St., Chicago, Ill.
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Clark Electric Co., Jas., Jr., 615 Bergman St., Louisville 3, Ky.
Clark Mfg. Co., 1830 E. 38th St., Cleveland 14, O.
Claronex Products, Inc., 239 Java St., Brooklyn, N. Y.
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Clayton Mfg. Co., P. O. Box 550, El Monte, Calif.
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Cleveland Brass Mfg. Co., The, 4606 Hamilton Ave., Cleveland, O.
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Cleveland Graphite Bronze Co., 17000 St. Clair Ave., Cleveland 10, O.
Cleveland Humidifier Co., 7802 Wade Park Ave., Cleveland 3, O.
Cleveland Punch & Shear Works Co., E. 40th and St. Clair Ave., Cleveland 14, O.
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Clifford Mfg. Co., Div. of Standard-Thomson Corp., 152 Grove St., Waltham 54, Mass.
Climax Machinery Co., Indianapolis, Ind.
Clinton Metallic Paint Co., P. O. Box 278, Clinton, N. Y.
Clizbe Bros. Mfg. Co., Plymouth, Ind.
Clow & Sons, James B., 201-299 N. Talman Ave., Chicago 12, Ill.
Cobra Pipe & Coil Co., Inc., Brook St., P. O. Box 176, Elmwood 10, Conn.
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Coe Mfg. Co., Bank St., Painesville, O.
Coffin Co., J. S., Jr., 326 S. Dean St., Englewood, N. J.
Cole-Sewell Engineering Co., 2288 University Ave., St. Paul 4, Minn.
Colebrook & Sons, Inc., W. H., 246 Walton St., Syracuse, N. Y.
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Colonial Alloys Co., Metals Div., Ridge Ave. and Crawford St., Philadelphia 29, Pa.
Columbia Radiator Co., 3400 Walnut St., McKeesport, Pa.
● Columbia Steel Co. (Sub. United States Steel Corp.), Russ Bldg., 235 Montgomery St., San Francisco 6, Calif.
Columbian Steel Tank Co., 1509 W. 12th St., Kansas City 7, Mo.
Columbus Heating & Ventilating Co., 182 N. Yale Ave., Columbus 16, O.
Columbus Steam Pump Wks. Co., 724 W. Gay St., Columbus 8, O.
● Combustion Control Corp., 77 Broadway, Cambridge 42, Mass.
Combustion Engineering-Superheater, Inc., 200 Madison Ave., New York 16, N. Y.
Combustion Systems Div., Vapofier Corp., 10316 S. Throop St., Chicago 43, Ill.
● Comfort Products Corp., 2220 Lamesa, Dallas 2, Tex.
Commercial Filters Corp., 18 W. Third, Boston 27, Mass.
Commercial Plastics Co., 1198 Merchandise Mart, Chicago 54, Ill.
Commercial Shearing & Stamping Co., 1775 Logan, P. O. Box 719, Youngstown 1, O.
Commonwealth Brass Corp., 5781-5835 Commonwealth Ave., Detroit 8, Mich.
Conco Engineering Works, Div. of H. D. Conkey & Co., Mendota, Ill.
● Condenser Service & Engineering Co., Inc., 95 River St., Hoboken, N. J.
Conditionaire Unit Co., 2821 Montrose Ave., Chicago 18, Ill.
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Congress Fan & Electric Co., P. O. Box 3747, Peninsula Sta., Daytona Beach, Fla.
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Connery Construction Co., 2nd and Luzerne Sts., Philadelphia 40, Pa.
● Connor Engineering Corp., W. B., 112 E. 32nd St., New York 16, N. Y.
Conoflow Corp., Dept. P, 2100 Arch St., Philadelphia 3, Pa.
Consolidated Car-Heating Co., Inc., Albany, N. Y.
● Continental Air Filters, Inc., 2520 Helm St., Louisville 1, Ky.
Continental-Diamond Fibre Co., Newark, Del.
Continental Electric Co., Inc., 323 Ferry St., Newark, N. J.
Continental Machine Co., 1952-54 Maud Ave., Chicago 14, Ill.
Continental Motors Corp., Muskegon 82, Mich.
Continental Products Co., 1150 E. 22nd St., Euclid 17, O.
Continental Radiant Glass Heat Corp., 521 Fifth Ave., New York 17, N. Y.
Continental Rubber Wks., 2000 Liberty St., Erie, Pa.
Continental Screw Co., Mt. Pleasant St., New Bedford, Mass.
Continental Steel Corp., 1108 S. Main St., Kokomo, Ind.
Controlair Mfg. Co., 1932 S. Compton Ave., Los Angeles, Calif.
Controidtemp Equipment Sales Corp., 236 Butler St., Brooklyn 17, N. Y.
Cook, Inc., A. D., Lawrenceburg, Ind.
Cook Electric Co., Diaphlex Div., 2700 Southport Ave., Chicago 14, Ill.
Cooper Alloy Foundry Co., The, Bloy St. & Ramsey Ave., Hillside, N. J.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Cooper Co., Clark, Palmyra, N. J.
Copeland Refrigeration Corp., Sidney, O.
Coppus Engineering Corp., 344 Park Ave., Worcester 2, Mass.
Coral Designs, P. O. Box 248, Forest Hills, N. Y.
Corbman Bros., Inc., 315 N. 7th St., Philadelphia 6, Pa.
Cordo Chemical Co., 34 Smith St., Norwalk, Conn.
● Cork Import Corp., 39 Park Pl., Englewood, N. J.
Cork Insulation Co., Inc., 155 E. 44th St., New York, N. Y.
Corley Co., Inc., The, One Exchange Place, Jersey City 2, N. J.
Corning Glass Works, Corning, N. Y.
Coroaire Heater Corp., The, 1124 Hanna Bldg., Cleveland 15, O.
Coughlan Co., G. N., West Orange, N. J.
● Couplings Co., 55 E. 18th St., Chicago 16, Ill.
Cramer Co., Inc., R. W., The, Centerbrook, Conn.
● Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.
Crane Packing Co., 1872 Cuyler Ave., Chicago 13, Ill.
CraneVeyor Corp., 1240 S. Boyle Ave., Los Angeles 23, Calif.
Crawford Co., 3220 W. 31st St., Chicago 23, Ill.
Crescent Tool Co., 230 Harrison St., Jamestown, N. Y.
Crise Mfg. Co., The, 2040 E. Main, Columbus, O.
Crittall Radiant Heating, Inc., Richard, 665 Fifth Ave., New York 22, N. Y.
Crocker-Wheeler Div. Elliott Co., Ampere 14, N. J.
Croll-Reynolds Engineering Co., Inc., 17 Johns St., New York 7, N. Y.
Croll & Son, Jesse G., 2326-2606 Germantown Ave., Philadelphia, Pa.
Crotty Mfg. Corp., 133-15 35th Ave., Flushing, L. I., N. Y.
Crown Controls Co., Inc., 124 S. Washington St., New Bremen, O.
Crown Die & Tool Co., 108 N. Jefferson St., Chicago 6, Ill.
Crown Iron Works Co., 1202 N. E. Tyler, Minneapolis, Minn.
Crozier Machine Tool Co., 684 N. Prairie Ave., Hawthorne, Calif.
Crucible Steel Co. of America, 405 Lexington Ave., New York, N. Y.
Cryer Trap & Valve Co., Inc., 366 Madison Ave., New York 17, N. Y.
Cuno Engineering Corp., 80 S. Vine St., Meriden, Conn.
Curtis Automotive Devices, Inc., 8 Norwood Ave., Dayton 7, O.
Curtis & Curtis Co., The, 450 Garden St., Bridgeport, Conn.
● Curtis Refrigerating Machine Div., Curtis Mfg. Co., 1950 Kienlen Ave., St. Louis 20, Mo.
Custom Engineering Co., 3138 W. Slauson Ave., Los Angeles 43, Calif.
Cutler-Hammer, Inc., 315 N. 12th St., Milwaukee 1, Wis.
Cyclotherm Corp., 157 E. First St., Oswego, N. Y.

D

Dahlquist Mfg. Co., Inc., Div. of Process Engineering Inc., 628 Somerville Ave., Somerville 43, Mass.
Dahlstrom Machine Works, 4970 N. Elston Ave., Chicago 30, Ill.
Daigger & Co., A., 161 W. Kinzie St., Chicago, Ill.
Dalmo-Victor Co., San Carlos, Calif.
Dalzen Tool & Mfg. Co., 13650 E. Ten Mile Rd., Detroit 5, Mich.
Dampney Co. of America, 1243 River St., Hyde Park, Boston 36, Mass.
Dana Fan & Blower Corp., 3501-27 Colerain Ave., Cincinnati 23, Ohio
Danzer Metal Works Co., Box 201, Hagerstown, Md.
Darcoid Co., Inc., 145 Sixth Ave., New York 13, N. Y.
Darling Valve & Mfg. Co., 701 First St., Williamsport, Pa.
Dart Mfg. Co., E. M., 134 Thurbers Ave., Providence 5, R. I.
DAS Div. of, Defiance Automatic Screw Co., Defiance, O.
Davey Compressor Co., Kent, O.
Davidson Co., M. T., 43-53 Keap St., Brooklyn 11, N. Y.
Davidson Hy Duty Roof Fan Co., 213 California St., Newton, Mass.
Davies & Co., Wayne, Westboro, Mass.

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Davis & Co., Dean W., 1006 First St., Kentland, Ind.
Davis Emergency Equipment Co., 201 Halleck St., Newark 4, N. J.
● Davis Engineering Corp., 1070 E. Grand St., Elizabeth 4, N. J.
Davis Regulator Co., 2546 S. Washtenaw Ave., Chicago 8, Ill.
Day & Night Div., Affiliated Gas Equipment, Inc., 710 Duarte Ave., Monrovia, Calif.
Day Co., The, 810-830 Third Ave., N. E., Minneapolis 13, Minn.
Dayton Air Compressor Co., Dayton, O.
● Dayton Rubber Co., 2342 W. Riverview Ave., Dayton 1, O.
Dean Brothers Pumps, Inc., 323 W. 10th St., Indianapolis 7, Ind.
Dean Hill Pump Co., 4000 E. 16th St., Indianapolis 7, Ind.
Dearborn Chemical Co., 310 S. Michigan Ave., Chicago 4, Ill.
Dearborn Stove Co., 1700 W. Commerce St., Dallas, Tex.
Debevoise Co., The, 968 Grand St., Brooklyn 6, N. Y.
● DeBothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Decatur Iron & Steel Co., P. O. Box 72, Decatur, Ala.
Decatur Pump Co., 2750 Nelson Park Dr., Decatur 70, Ill.
Defender Instrument & Regulator Co., 815 Clark Ave., St. Louis 2, Mo.
De Laval Steam Turbine Co., Trenton 2, N. J.
Delavan Mfg. Co., 3007-Sixth Ave., Des Moines 13, Ia.
Delco Appliance Div., General Motors Corp., P. O. Box 230, Rochester 1, N. Y.
Delco Products Div., General Motors Corp., 329 E. First St., Dayton 1, O.
Delta-Star Electric Co., 2400 Block, Fulton St., Chicago, Ill.
Deming Co., 14 Aetna St., Salem, O.
Demuth & Sons, Charles, 245 Elm Place, Mineola, L. I., N. Y.
Dersch, Gesswein & Neuert, Inc., 4849 W. Grand Ave., Chicago 39, Ill.
Desmond-Stephan Mfg. Co., Urbana, O.
Desolvo Co., The, 719 Foreland St., Pittsburgh 12, Pa.
d'Este Div., Kaye & MacDonald, Inc., 11-15 Central Ave., West Orange, N. J.
Detroit Brass & Malleable Works, 100 S. Campbell, Detroit 9, Mich.
Detroit Diesel Engine Div., General Motors Corp., 13400 W. Outer Dr., Detroit 23, Mich.
● Detroit Lubricator Co., 5900 Trumball Ave., Detroit 8, Mich.
Detroit Stamping Co., 350 Midland Ave., Detroit 3, Mich.
● Detroit Stoker Co., Fifth Floor, General Motors Bldg., Detroit 2, Mich.
Devices, Inc., 280 Madison Ave., New York, N. Y.
DeVilbiss Co., The, 300 Phillips Ave., Toledo 1, O.
Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., 1932 Oliver Bldg., Pittsburgh 22, Pa.
Devoe & Raynolds Co., Inc., 44th St. and 1st Ave., New York 17, N. Y.
Dewey-Shepard Boiler Co., 1311 N. Capitol Ave., Indianapolis, Ind.
De Zurik Shower Co., Sartell, Minn.
Dial Light Co. of America, Inc., 900 Broadway, New York 3, N. Y.
Diamond Chain & Mfg. Co., 438 Kentucky Ave., Indianapolis 7, Ind.
Diamond Chemical Products, 17 E. 48th St., New York, N. Y.
Diamond Expansion Bolt Co., Inc., 500 North Ave., Garwood, N. J.
Diamond Iron Works, Inc., 1728 Second St. N., Minneapolis 11, Minn.
Diamond Machine Tool Co., 3429 E. Olympic Blvd., Los Angeles 23, Calif.
Diamond Mfg. Co., 253 W. Eighth St., Wyoming, Pa.
Diamond Power Specialty Corp., P. O. Box 288, Detroit 31, Mich.
Diceler Div. of General Machine & Mfg. Co., Blair St. and Spring Garden Ave., Berwick, Pa.
Dick Co., Inc. R. & J., 24-48 Sade St., Passaic, N. J.
Dickinson, Aeolus, 3320 S. Artesian Ave., Chicago, Ill.
Diehl Mfg. Co., Finderne Plant, 1106 Finderne Ave., Somerlille, N. J.
Dietzgen Co., Eugene, 2425 Sheffield Ave., Chicago 14, Ill.
Dillon Co., Inc., W. C., 5410 W. Harrison St., Chicago 44, Ill.
Dillon Steam Boiler Wks., Inc., D. M., Crocker St., Fitchburg, Mass.
Division Lead Co., 836 W. Kinzie St., Chicago 22, Ill.
Dixon Crucible Co., Joseph, Wayne & Monmouth Sts., Jersey City 3, N. J.
Doall Co., The, 254 N. Laurel Ave., Des Plaines, Ill.
Dockson Corp., 3839 Wabash Ave., Detroit 8, Mich.
Dockstader, Inc., S. E., 1128 Munsey Bldg., Washington 4, D. C.
● Dodge Mfg. Corp., 500 S. Union St., Mishawaka, Ind.
● Dole Valve Co., The, 1933 Carroll Ave., Chicago 12, Ill.
● Dollinger Corp., 9 Centre Park, Rochester 3, N. Y.
Domestic Engine & Pump Co., Shippensburg, Pa.
Douglass Automatic Controls Co., 4505 Firestone Blvd., South Gate, Calif.
Dover Metal Products Co., The, Canal Fulton, O.
Dow Chemical Co., The, Midland, Mich.
Dow Corning Corp., Midland, Mich.
Dowell Inc., 524 Kennedy Bldg., Tulsa 3, Okla.
Downingtown Iron Works, Wallace Ave., Downingtown, Pa.
● Doyle & Roth Mfg. Co., Foot of 23rd St., Brooklyn 32, N. Y.
Doyle Vacuum Cleaner Co., 225 Stevens St., S. W., Grand Rapids 2, Mich.
Dravo Corp., Machinery Div., Dravo Bldg., Pittsburgh 22, Pa.
Drayer & Hanson, Inc., 3301 Medford Ave., Los Angeles 33, Calif.
Dreis & Krump Mfg. Co., 7404 Loomis Blvd., Chicago 36, Ill.
Dreis Co., Ltd., Edward J., 841 County Rd., San Carlos, Calif.
Dresser Mfg. Div., Dresser Industries, Inc., 490 Fisher Ave., Bradford, Pa.
Drico Industrial Corp., 29 Broadway, New York 6, N. Y.
Drinkwater, Inc., Spring & Madison St., Waukegan, Ill.
Dry Air Products Corp., 734 Jackson Place, Washington 6, D. C.
Drying Systems, Inc., 1812¼ W. Foster Ave., Chicago 40, Ill.
Dryomatic Corp of America, 1600 Union Ave., Baltimore 11, Md.
Dry-Zero Corp., Merchandise Mart, Chicago 54, Ill.
Dual-Air Fan Co., P. O. Box 169, South Elgin, Ill.
Dudgeon, Inc., Richard, Columbia and Broome Sts., New York 2, N. Y.
Duffy Engineering Co., 536 S. E. 6th, Portland 14, Ore.
● Dunham Co., C. A., 400 W. Madison St., Chicago 6, Ill.
Dunkirk Radiator Corp., Dunkirk, N. Y.
Duo-Therm Div., Motor Wheel Corp., Lansing 3, Mich.
du Pont de Nemours & Co., E. I., Polychemicals Dept., Wilmington 98, Del.
du Pont de Nemours & Co., E. I., Electrochemicals Dept., Wilmington 98, Del.
du Pont de Nemours & Co., Inc., E. I., Fabrics & Finishes Dept., Wilmington 98, Del.
du Pont de Nemours & Co., E. I., Grasselli Chemicals Dept., Wilmington 98, Del.
du Pont de Nemours & Co., E. I., Photo Products Dept., Wilmington 98, Del.
Durabla Mfg. Co., 114 Liberty St., New York 6, N. Y.
Durakool, Inc., 1010 N. Main St., Elkhart, Ind.
Duraloy Co., Scottdale, Pa.
● Durant Insulated Pipe Co., 1015 Runnymede St., P. O. Box 88, East Pale Alto, Calif.
● Duriron Co., Inc., The, 450 N. Findlay St., Dayton 1, O.
Duro Co., 537 Monument Ave., Dayton, O.
Duro Metal Products Co., 2649 N. Kildare Ave., Chicago, Ill.
Dust Filter Co., 4418 N. Clark St., Chicago 40, Ill.
Dust Suppression & Engineering Co., 154 Grove St., Lake Orion, Mich.
Dustlix Corp., 715 N. Van Buren St., Milwaukee, Wis.
Dutton Co., C. H., 623 Gibson St., Kalamazoo 6, Mich.
Dwyer Mfg. Co., F. W., 317 S. Western Ave., Chicago 12, Ill.
Dynamic Air Engineering, Inc., 1619 S. Alameda, Los Angeles 21, Calif.
Dzus Fastener Co., Inc., P. O. Box 785, Babylon, N. Y.

E

● Eagan Co., Inc., Walter H., 2336-38 Fairmount Ave., Philadelphia 30, Pa.
Eagle-Picher Co., American Bldg., Cincinnati 1, O.
Eaglesfield Ventilator Co., 910-20 Dorman St., Indianapolis, Ind.
Eastern Air Devices, Inc., 130 Flatbush Ave., Brooklyn 17, N. Y.
Eastern Foundry Co., Peerless Heater Div., Boyertown, Pa.
Eastern Industries Inc., 396 Elm St., New Haven 6, Conn.
Eastern Stainless Steel Corp., P. O. Box 1975, Baltimore 3, Md.
Eastman Kodak Co., Kodak Park, Rochester 4, N. Y.
Ebco Mfg. Co., 401 W. Town St., Columbus 8, O.
Eckhart Mfg. Co., Inc., 470 First Ave., West, Roselle, N. J.
Eclipse Air Brush Co., Inc., 381 Park Ave., Newark, N. J.
Eclipse Fuel Engineering Co., 707 S. Main St., Rockford, Ill.
Econocol Stoker Div. of Cotta Transmission Co., 2340 11th St., Rockford, Ill.
Economy Equipment Co., 919 W. 49th Pl., Chicago 9, Ill.
● Economy Pumps, Inc., 1000 Weller Ave., Hamilton, O.
Economy Valve Seat Co., 3122 N. California Ave., Chicago 18, Ill.
Eddy Stoker Corp., 4717 W. North Ave., Chicago 39, Ill.
Eddy Valve Co., Waterford, N. Y.
Edge Moor Iron Wks., Inc., Edge Moor 25, Del.
Edison, Inc., Thomas A., Instrument Div., Lakeside Ave., West Orange, N. J.
Edward Valves, Inc, 1200 W. 145th St., East Chicago, Ind.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Eiker Mfg. Co., Ogallala, Neb.
Eisler Engineering Co., Inc., 754 S. 13th St., Newark 3, N. J.
Elastic Porcelain Lining Corp., 221 Norris Dr., Rochester 10, N. Y.
Elastic Stop Nut Corp. of America, 2330 Vauxhall Rd., Union, N. J.
● Elco Tool & Screw Corp., 1800 Broadway, Rockford, Ill.
Electradiant Corp., 500 Del Monte Ave., Monterey, Calif.
Electric Arc, Inc., 152 Jelliff Ave., Newark 8, N. J.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo 1, O.
Electric Controller & Mfg. Co., 2700 E. 79th St., Cleveland 4, O.
Electric Cord Co., 30 Church St., New York 7, N. Y.
Electric Machinery Mfg. Co., 1331 Tyler St., N. E., Minneapolis 13, Minn.
Electric Sprayit Co., The, 1415-25 Illinois Ave., Sheboygan, Wis.
Electric Steel Foundry Co., 2141 N. W. 25th St., Portland, Ore.
Electrimatic Co., Sales Affiliate, Jas. P. Marsh Corp., 3501 Howard St., Skokie, Ill.
Electro Dynamic, Div. of the Electric Boat Co., Bayonne, N. J.
Electro Products Laboratories, Inc., 4501 N. Ravenswood Ave., Chicago, Ill.
Electro Rust-Proofing Corp., Belleville, N. J.
Electrol Burner Mfg. Co., Inc., 22 Union Ave., Rutherford, N. J.
Electromode Corp., 45 Crouch St., Rochester 3, N. Y.
Electro-Switch & Controls Inc., 8568 W. Washington Blvd., Culver City, Calif.
Electrovent Fan & Mfg. Co., 812 W. Lake St., Chicago 7, Ill.
Elgin Softener Corp., Elgin, Ill.
Elgo Shutter & Mfg. Co., 2738 W. Warren Ave., Detroit 8, Mich.
Elliott Co., Jeannette, Pa.
Ellis Drier Co., 2444 N. Crawford Ave., Chicago 39, Ill.
Ellison Draft Gage Co., 214 W. Kinzie St., Chicago 10, Ill.
Ellsworth Pipe & Supply Co., 513 W. Traser St., Milwaukee 3, Wis.
Elraco Engineering Co., 732 W. 58th St., Los Angeles 37, Calif.
Emerson Electric Mfg. Co., The, 8100 Florissant Ave., St. Louis 21, Mo.
Empire Sheet & Tin Plate Co., N. Bowman St., Mansfield, O.
Empire Ventilation Equipment Co., 35-39 Vernon Blvd., Long Island City, N. Y.
Endura Mfg. Corp., 45 N. 4th St., Quakertown, Pa.
Engelhard, Inc., Charles, 900 Passaic Ave., East Newark, N. J.
Engineer Co., 75 West St., New York 6, N. Y.
● Enterprise Engine & Foundry Co., 18th & Florida Sts., San Francisco 10, Calif.

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Equipoise Controls, 100 Stevens Ave., Mount Vernon, N. Y.
Erdle Perforating Co., 171 York St., Rochester 11, N. Y.
Ergolyte Mfg. Co., 3627 Lawrence St., N., Philadelphia 40, Pa.
Erickson Specialty Co., 10 Cayuga St., P. O. Box 141, Cohoes, N. Y.
Erie Bolt & Nut Co., Erie, Pa.
Erie City Iron Wks., 1450 East Ave., Erie, Pa.
Erie Tool Wks., 11th & French Sts., Erie 2, Pa.
Ernst Water Column & Gage Co., 250 Livingston Ave., Livingston, N. J.
Ess Instrument Co., 96 Washington Ave., Bergenfield, N. J.
Ess Specialty Corp., 96 S. Washington Ave., Bergenfield, N. J.
Essex Wire Corp., Div. of., 37 Manchester Ave., Detroit, Mich.
Essick Mfg. Co., 1950 Santa Fe Ave., Los Angeles 21, Calif.
Eutectic Welding Alloys Corp., 40 Worth St., New York 13, N. Y.
Even-Ray Co., Inc., 93 Tiffany Blvd., Newark 4, N. J.
Everhot Products Co., 2059 W. Carroll, Chicago 12, Ill.
Everite Pump & Mfg. Co., Inc., P. O. Box 1391, Lancaster, Pa.
Everlasting Valve Co., 49 Fisk St., Jersey City 5, N. J.
Ewing Mfg. Co., 2545 N.W. 10th, Oklahoma City 7, Okla.
Excelsior Leather Washer Mfg. Co., 720-730 Chestnut St., Rockford, Ill.
Excelsior Steel Furnace Co., The, 118 S. Clinton St., Chicago 6, Ill.
Excelsior Tool & Machine Co., 31st & Ridge Ave., East St. Louis, Ill
Extruded Plastics, Inc., New Canaan Ave., Norwalk, Conn.
E-Zee Tool Mfg. Corp., 136 Liberty St., New York 6, N. Y.

F

FASCO Industries, Inc., P. O. Box 509, Rochester 2, N. Y.
Faber Engineering Co., Inc., Amber & Westmoreland Sts., Philadelphia, Pa.
Fafnir Bearing Co., 37 Booth St., New Britain, Conn.
● Fairbanks Co., 393 Lafayette St., New York 3, N. Y.
Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.
Fairmont Aluminum Co., Fairmont, W. Va.
Falcon Equipment Co., 13th St., New Brighton, Pa.
Falk Corp., 3010 W. Canal St., Milwaukee 8, Wis.
Falstrom Co., 26 Falstrom Court, Passaic, N. J.
Famco Machine Co., 1314 18th St., Racine, Wis.
Farley Sleeve & Hanger Co., 3748 E. 71st St., Cleveland, O.
Farquhar Co., A. B., 142 N. Duke St., York, Pa.
● Farr Co., 2615 Southwest Dr., Los Angeles 43, Calif.
Farrar & Trefts, 20 Milburn St., Buffalo 12, N. Y.
Farris Engineering Corp., 400 Commercial Ave., Palisades Park, N. J.
● Fedders-Quigan Corp., 57 Tonawanda St., Buffalo 7, N. Y.
Federal Boiler Co., Inc., Granite & West Sts., Midland Park, N. J.
Federal Machine & Welder Co., The, Overland Ave., Warren, O.
Federal-Mogul Corp., 11031 Shoemaker St., Detroit 13, Mich.
Federated Metals Div., American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Fee and Stemwedel, Inc., 2210 Wabansia Ave., Chicago 47, Ill.
Felt Products Mfg. Co., 1504 Carroll Ave., Chicago 7, Ill.
Felters Company, The, 210 South St., Boston 11, Mass.
Fenwal, Inc., 200 Pleasant St., Ashland, Mass.
Ferguson & Lange Foundry Co., 1039 Willow St., Chicago, Ill.
Fern, Ralph, 2517 Boulevard Ave., Scranton 9, Pa.
Ferro-Nil Corp., 381 Fourth Ave., New York 16, N. Y.
Field Control Div., H. D. Conkey & Co., Mendota, Ill.
Filtair Mfg. Co., 487 S. Van Ness Ave., San Francisco 3, Calif.
Filtrine Mfg. Co., Inc., 53A Lexington Ave., Brooklyn 5, N. Y.
Fingles Co., The, Reistertown Rd. at Elgin Ave., Baltimore 17, Md.
Finn & Co., 2850 8th Ave., New York 30, N. Y.
Finn Engineers, Jerry, 2430 University Ave., St. Paul 4, Minn.
Fintube Coil Corp., 19 W. Main St., Alhambra, Calif.
Fire-King Stoker Co., 3760 E. St. Clair, Indianapolis, Ind.
Fireline Stove & Furnace Lining Co., 1800 Kingsbury St., Chicago 14, Ill.
Firemood Machine Wks., Converse, Ind.
Firestone Industrial Products, 1200 Firestone Pkwy., Akron 17, O.
Fir-Tex Insulating Board Co., St. Helens, Ore.
Fischer & Porter Co., 600 County Line Rd., Hatboro, Pa.
Fish-Schurman Corp., 230 E. 45th St., New York 17, N. Y.
● Fisher Governor Co., 205 S. First Ave., Marshalltown, Ia.
Fisher Research Laboratory, Inc., 1961 University Ave., Palo Alto, Calif.
Fitch, Allen & Co., 1131 Bryn Mawr Ave., Chicago 40, Ill.
● Fitzgibbons Boiler Co., Inc., 101 Park Ave., New York 17, N. Y.
Flagg & Co., Inc., Stanley G., 1421 Chestnut St., Philadelphia 2, Pa.
Flemm Lead Co., Inc., Bradley Ave. & School St., Long Island City 1, N. Y.
Flexible Tubing Corp., Branford, Conn.
Flexitallic Gasket Co., 8th & Bailey Sts., Camden, N. J.
Flexlock Corp., 411 E. Market St., Akron, O.
Flexo Supply Co., Inc., 4649 Page Blvd., St. Louis 13, Mo.
Flintkote Co., The, 30 Rockefeller Plaza, New York 20, N. Y.
Flori Pipe Co., The, 601 E. Red Bud Ave., St. Louis 15, Mo.
Floridin Co., Warren, Pa.
Fluid Heat Div., Anchor Post Products, Inc., 6500 Eastern Ave., Baltimore 24, Md.
Fluid Systems, Inc., 1881 Dixwell Ave., New Haven, Conn.
Fluor Corp., Ltd., The, 2500 S. Atlantic Blvd., Los Angeles 22, Calif.
Flynn & Emrich Co., 301 Holliday St., Baltimore 2, Md.
Follansbee Steel Corp., 3rd and Liberty Aves., Pittsburgh, Pa.
Forney Engineering Co., 2705 Hawes St., Dallas 9, Tex.
Forty-Eight Insulations, Inc., N. Aurora St., Aurora, Ill.
Fossum, M. H., 2086 Marshall Ave., St. Paul, Minn.
Foster Co., Benjamin, 4635 W. Girard Ave., Philadelphia 31, Pa.
Foster Engineering Co., 835 Lehigh St., Union, N. J.
Foster Pump Wks., Inc., 46-A Washington St., Brooklyn 1, N. Y.
● Foster Wheeler Corp., 165 Broadway, New York 6, N. Y.
Fox Control & Mfg. Co., 3589 E. 93rd St., Cleveland, O.
Foxboro Co., 106 Neponset Ave., Foxboro, Mass.
Fram Corp., Providence 16, R. I.
France Packing Co., 6512 State Rd., Tacony, Philadelphia 35, Pa.
Franklin Electric Co., Inc., Bluffton, Ind.
Frederick Iron & Steel Inc., E. 7th St., Frederick, Md.
Freed Products Co., 1510 Third Ave., Moline, Ill.
Freeman Stoker Div., Illinois Iron & Bolt Co., 914 S. Michigan Ave., Chicago 5, Ill.
Fresh'nd-Aire Co., Div. of Cory Corp., 221 N. LaSalle St., Chicago 1, Ill.
Fretz-Moon Tube Co., Inc., Butler, Pa.
● Frick Co., Waynesboro, Pa.
Friez Instrument Div., Bendix Aviation Corp., Taylor Ave., Towson, Baltimore 4, Md.
Frigidaire Div., General Motors Corp., Dayton 1, O.
Frost Mfg. Co., S. Henderson St., Galesburg, Ill.
Fuel Savers, Inc., 15th and Herr Sts., Harrisburg, Pa.
Fuelguard Co., 2826 Fondren Dr., Dallas 5, Tex.
Fulflo Specialties Co., Inc., The, Blanchester, O.
Fuller Co., 124 Bridge St., Catasauqua, Pa.
● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Box 400, Knoxville 4, Tenn.
Furst Electronics, 800 W. North Ave., Chicago 22, Ill.

G

G. D. S. Machinery & Supply Co., Inc., 101 Walker St., New York, N. Y.
G & H Mfg. Co., 3047 Amber St., Philadelphia 34, Pa.
G. M. Mfg. Co., 50 W. 3rd St., New York 12, N. Y.
● G & O Mfg. Co., 138 Winchester Ave., New Haven 8, Conn.
● Gallaher Co., The, Owatonna, Minn. & Omaha, Neb.
Galv-Weld Products, P. O. Box 37, Sta. D, Dayton 10, O.
Gannon Co., Russell R., 700 Dixie Terminal Bldg., Cincinnati 2, O.
Garden City Fan Co., 332 S. Michigan Ave., Chicago 4, Ill.
Garden City Instruments, Inc., 608 S. Dearborn St., Chicago 5, Ill.
Gardiner Metal Co., 2514 W. 48th Pl., Chicago 32, Ill.
Gardner-Denver Co., Quincy, Ill.
Garlock Packing Co., 50 Main St., Palmyra, N. Y.
Gas & Oil Industry Laboratories, Inc., 4 Paine Ave., Irvington, N. J.
Gasflux Co., Mansfield, O.
Gates Engineering Co., P. O. Box 1711, Wilmington, Del.
Gates Rubber Co., The, 999 S. Broadway, Denver 17, Colo.
Gatke Corp., 228 N. LaSalle St., Chicago, Ill.
Gehri Co., 1117 Tacoma Ave., Tacoma 3, Wash.
● General Blower Co., 8610 Ferris Ave., Morton Grove, Ill.
General Blower Co., Inc., 6137 Market St., Philadelphia 39, Pa.
General Ceramics & Steatite Corp., Keasbey, N. J.
● General Controls Co., 801 Allen Ave., Glendale 1, Calif.
General Corporation, 3353 University Ave., Minneapolis 14, Minn.
General Die and Stamping Co., 262-272 Mott St., New York 12, N. Y.
General Electric Co., Air Conditioning Dept., 5 Lawrence St., Bloomfield, N. J.
General Electric Co., Apparatus Dept., 1 River Rd., Schenectady 5, N. Y.
General Electric Co., Chemical Dept., 1 Plastics Ave., Pittsfield, Mass.
General Electric Co., Lamp Dept., Nela Park, Cleveland 12, O.
General Engineering & Mfg. Co., 4417 Oleatha St., St. Louis 16, Mo.
General Filter Co., 923 Second Ave., Ames, Ia.
General Filters, Inc., 12890 Westwood, Detroit 23, Mich.
General Fittings Co., 123 Georgia Ave., Providence 5, R. I.
● General Gas Light Co., 212 N. Park, Kalamazoo 11F, Mich.
General Insulating Products Co., 8821 15th Ave., Brooklyn, N. Y.
General Machinery Co., 3500 Riverside Ave., Spokane 1, Wash.
● General Oil Burner Corp., 2300 Sinclair Lane, Baltimore 13, Md.
General Ozone Corp., 1455 W. Congress St., Chicago 7, Ill.
General Plate Div., Metals & Controls Corp., 34 Forest St., Attleboro, Mass.
General Power Plant Corp., 381-4th Ave., New York 16, N. Y.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
General Scientific Equipment Co., 27th & Huntingdon Sts., Philadelphia 32, Pa.
Genspring, Inc., 500 Fifth Ave., New York 18, N. Y.
Gerett Corp., M. A., 724 W. Winnebago St., Milwaukee 5, Wis.
Germatrol Corp., 622 Brookline Blvd., Pittsburgh 26, Pa.
Gerstein & Cooper Inc., 1 W. 3rd St., South Boston, Mass.
Giannini & Co., Inc., G. M., 254 W. Colorado St., Pasadena 1, Calif.
Giant Mfg. Co., South Ave., Council Bluffs, Ia.
Gilbert & Barker Mfg. Co., West Springfield, Mass.
Gilbert Brass Foundry Co., 5028 Farlin St., St. Louis, Mo.
Gil-Lair Products, Inc., 81 Masonic Ct., Pasadena 3, Calif.
Gilmer Company, L. H., Div. of United States Rubber Co., Tacony, Philadelphia 35, Pa.
Gisholt Machine Co., 1253 E. Washington Ave., Madison 10, Wis.
Glaser Lead Co., Inc., 31 Wyckoff Ave., Brooklyn, N. Y.
● Glasfloss Corp., 155 E. 44th St., New York, N. Y.
Gleason-Avery, Inc., 27 Clark St., Auburn, N. Y.
Glenn-Roberts Co., Inc., 2107 Adams St., Indianapolis 18, Ind.
Globe Phone Mfg. Co., 2 Linden St., Reading, Mass.
Globe Steel Tubes Co., 3839 W. Burnham St., Milwaukee 4, Wis.
Goese Mfg. Co., 2548 N. 18th St., Milwaukee 6, Wis.
Goethel Sheet Metal Wks., Alfred, 1910 N. Killian Pl., Milwaukee, Wis.
Goettl Bros. Metal Prod. Inc., 714 S. Central Ave., Phoenix, Ariz.
Golden-Anderson Valve Specialty Co., Keenan Bldg., Pittsburgh, Pa.
Goldens' Foundry & Machine Co., Columbus, Ga.
● Gold Top Heating, Inc., 1400 E. Second St., Butte, Mont.
Goodfellow Co., E. D., 346 N. Front St., Memphis, Tenn.
Goodrich Co., B. F., 548 S. Main St., Akron 18, O.

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Goodyear Tire & Rubber Co., 1144 E. Market St., Akron 16, O.
Goodyer Industries, Inc., 224 S. Michigan Ave., Chicago 4, Ill.
Gorman-Rupp Co., Mansfield, O.
Gorton Heating Corp., Cranford, N. J.
Goss Gas Inc., 5209 Baum Blvd., Pittsburgh 24, Pa.
Gotham Instrument Co., Inc., 149 Wooster St., New York 12, N. Y.
Goulds Pumps, Inc., Fall St., Seneca Falls, N. Y.
● Governair Corp., 513 N. Blackwelder St., Oklahoma City 1, Okla.
Grabler Mfg. Co., 6565 Broadway, Cleveland 5, O.
Graham Mfg. Co., Inc., 415 Lexington Ave., New York 17, N. Y.
Graham Transmissions, Inc., 3754 N. Holton St., Milwaukee 12, Wis.
Granite City Steel Co., 20th & Madison Ave., Granite City, Ill.
Grant Wilson Inc., 315 S. Sherman St., Chicago 4, Ill.
Graton & Knight Co., 356 Franklin St., Worcester 4, Mass.
Graver Water Conditioning Co., 216 W. 14th St., New York 11, N. Y.
Gray Metal Products, Inc., 30 Carleton St., Rochester, N. Y.
Great Lakes Steel Corp., Ecorse, Detroit, Mich.
Great National Air Conditioning Corp., 342 Oklahoma Natural Bldg., Oklahoma City, Okla.
Green Fire Brick Co., A. P., Mexico, Mo.
Green Fuel Economizer Co., 780 Main St., Beacon, N. Y.
Greene, Tweed & Co., North Wales, Pa.
Greenfield Tap & Die Corp., Sanderson St., Greenfield, Mass.
● Greenlee Tool Co., Div. of Greenlee Bros. & Co., 2136 12th St., Rockfordford, Ill.
Greer Hydraulics, Inc., 454 18th St., Brooklyn 15, N. Y.
Greiner Co., Emil, 161 Sixth Ave., New York, N. Y.
Greyhound A. C. Arc Welder Corp., 606 Johnson Ave., Brooklyn 6, N. Y.
Grief, Edward C., 64 West End Ave., Bagota, N. J.
Griffin & Co., Inc., 500 Bergman Ave., Louisville, Ky.
Griffith Equipment Co., Inc., Los Angeles, Calif.
● Grinnell Co., Inc., 260 W. Exchange, Providence 1, R. I.
Griscom-Russell Co., The, 285 Madison Ave., New York 17, N. Y.
Grobet File Corp. of America, 421 Canal St., New York 13, N. Y.
Gross-Aire Mfg. Co., 9416 W. Milton Ave., Overland 14, Mo.
Grove Regulator Co., 6529 Hollis St., Oakland, Calif.
Guardian Electric Mfg. Co., 1621 W. Walnut St., Chicago 12, Ill.
Guardian Products Corp., 1215 E. 2nd St., Michigan City, Ind.
Guild & Garrison, Inc., 43 Keap St., Brooklyn 11, N. Y.
Gunnite Foundries Corp., 302 Peoples Ave., Rockford, Ill.
Gustin Bacon Mfg. Co., 1412 W. 12th St., Kansas City 7, Mo.
Guth Co., Edwin F., 2615 Washington Blvd., St. Louis 3, Mo.

H

H-A Mfg. Co., 444 Salem Ave., York, Pa.
H. & A. Co., 86-100 Leroy Ave., Buffalo 14, N. Y.
H-B Instrument Co., 2633 Trenton Ave., Philadelphia 25, Pa.
● H & H Tube & Mfg. Co., 245-275 N. Forman Ave., Detroit 17, Mich.
Haering & Co., Inc., D. W., 205 W. Wacker Dr., Chicago 6, Ill.
Hagan Corp., Hagan Bldg., Pittsburgh 30, Pa.
Hager Bros., East P. O. Box 1511, Rockford, Ill.
Hague & Co., Alfred, 230 Thirty-fourth St., Brooklyn 32, N. Y.
● Haines & Co., William S., 1010-12-14 Wood St., Philadelphia 7, Pa.
● Hajoca Corp., P. O. Box 7319, Philadelphia 1, Pa.
Halowax Products Div., Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Halstead & Mitchell, Bessemer Bldg., Pittsburgh 22, Pa.
Hamburg Boiler Wks., Inc., Grand St., Hamburg, Pa.
Hamer Oil Tool Co., 2919 Gardenia Ave., Long Beach 6, Calif.
Hamilton Rubber Mfg. Corp., Box 361, Trenton 3, N. J.
Hammel-Dahl Co., 243 Richmond St., Providence 3, R. I.
Hammett Electric Mfg. Co., 706-708 E. 18th St., Kansas City 8, Mo.
Hammond Brass Wks., Summer Blvd., Hammond, Ind.
Hampton-Cross Co., The, 120 S. 10th St., Louisville 2, Ky.
Hampton Electric Mfg. Co., 1238 Voskamp St., Pittsburgh 12, Pa.
Handy & Harman, 82 Fulton St., New York 7, N. Y.
● Haney Gas Burner & Engineers, 909 S. Myrtle Ave., Monrovia, Calif.
Hanovia Chemical & Mfg. Co., 100 Chestnut St., Newark 5, N. J.
Hansen Mfg. Co., Inc., Princeton 6, Ind.
Hanson-Gates Mfg. Co., Inc., 174 Lowell St., Reading, Mass.
Hardinge Oil Burner & Mfg. Co., 1700 Berteau St., Chicago 13, Ill.
Hardy, Inc., Charles, 420 Lexington Ave., New York, N. Y.
Harnischfeger Corp., 4400 W. National Ave., Milwaukee, Wis.
Harper Co., H. M., Morton Grove, Ill.
Harrington & King Perforating Co., 5655 Fillmore St., Chicago 44, Ill.
Harris, A. R., 4548 Hohman Ave., Hammond, Ind.
Harris Calorific Co., The, 5501 Cass Ave., N. W., Cleveland 2, O.
Harris & Co., Arthur, 210 N. Aberdeen St., Chicago 7, Ill.
Harrisburg Machinery Corp., 7th & Curtin St., Harrisburg, Pa.
Harrisburg Steel Corp., 10th & Herr Sts., Harrisburg, Pa.
Harry Cooling Towers, Inc., 554 W. 48th St., New York 19, N. Y.
Hart & Cooley Mfg. Co., Holland, Mich.
Hart Mfg. Co., The, Hamilton St., Hartford 1, Conn.
Hartmann Co., Chas., 985 Dean St., Brooklyn, N. Y.
Hartzell Propeller Fan Co., P. O. Box 909, Roosevelt Ave., Piqua, O.
Harvey-Whipple, Inc., Springfield, Mass.
Hasco Valve & Machine Co., 1819 W. St. Paul Ave., Milwaukee 3, Wis.
Haskell Mfg. Co., Wm. H., 20 Commerce St., Pawtucket, R. I.
Hastings Air Conditioning Co., Box 481, 108 S. Colorado Ave., Hastings, Neb.
● Hastings Instrument Co., P. O. Box 1275, Hampton, Va.
Hausman Mfg. & Sales Co., Dept. HP, 1243 N. Harding Ave., Chicago 51, Ill.
Haveg Corp., Newark, Del.
Haydon Mfg. Co., Inc., Sub. General Time Instruments Corp., Torrington, Conn.
● Hayes Furnace & Mfg. Co., 2929 S. Fairfax Ave., Los Angeles 16, Calif.
● Hays Corp., 782 E. 8th St., Michigan City, Ind.
Hays Mfg. Co., 801 W. 12th St., Erie, Pa.
Health Trola Div., Excel Heating & Air Conditioning Co., 3715 Belmont Ave., Chicago 18, Ill.
Healy Ruff Co., 2257 University Ave., St. Paul 4, Minn.
Heartley Machine & Tool Co., 900-8 Summit St., Toledo, O.
Heat Equipment not Inc., 1020 E. 75th St., Chicago 19, Ill.
Heat Timer Corp., 160 Fifth Ave., New York 10, N. Y.
Heat Transfer Products, Inc., P. O. Box 516, Carbondale, Pa.
Heat-X-Changer Co., Inc., The, Brewster, N. Y.
Heating Assurance, Inc., 124 E. Augusta St., Spokane 13, Wash.
Hegeler Zinc Co., P. O. Box 599, Danville, Ill.
Heilman Boiler Wks., Allentown, Pa.
Helicoid Gage Div., American Chain & Cable Co., Inc., Bridgeport 2, Conn.
Hendley & Whittemore, 6 Blackhawk Blvd., Beloit, Wis.
Hendrick Mfg. Co., 37 Dundaff St., Carbondale, Pa.
Henkel-Clauss Co., The, Fremont, O.
Henry Furnace Co., The, Medina, O.
● Henry Valve Co., Melrose Park, Ill.
Henry & Wright, Div. of Hartford-Empire Co., 760 Windsor St., Hartford, Conn.
Herbert Boiler Co., 2300 Bloomingdale Ave., Chicago, Ill.
Her-Born Engineering & Mfg. Co., 212 Columbus Ave., Sandusky, O.
Herbusch Corp., The, 706 Chestnut St., 210 Title Guaranty Bldg., St. Louis 1, Mo.
Hercules Chemical Co., Inc., 332 Canal St., New York 13, N. Y.
Hercules Electric & Mfg. Co., Inc., 2500 Atlantic Ave., Brooklyn 7, N. Y.
Hercules Float Wks., 200 Franklin St., Springfield, Mass.
Heresite & Chemical Co., Manitowoc, Wis.
Hersey Mfg. Co., South Boston, Mass.
Hershey Machine & Foundry Co., Motorstoker Div., Manheim, Pa.
Hertner Electric Co., The, 12690 Elmwood Ave., Cleveland 11, O.
Hess Co., The, 132 N. Clinton St., Chicago 6, Ill.
Hetzel Roofing Products Co., 67 Maine St., Newark 5, N. J.
Hexdall Co., A. M., Morris, Ill.
Highside Chemicals Co., 10 Colfax Ave., Clifton, N. J.
Hill Diesel Engine Div. of Indian Motocycle Co., Lansing 3, Mich.
Hill, E. Vernon & Co., 6826 W. Highland Ave., Chicago 31, Ill.
Hilo Varnish Corp., 55 Stewart Ave., Brooklyn 6, N. Y.
Hinde & Dauch Paper Co., P. O. Box 861, Sandusky, O.
Hinderliter Tool Co., The, Div. of the H. K. Porter Co., Inc., Tulsa, Okla.
Hirschman-Pohle Co., Inc., 12 Lent Ave., LeRoy, N. Y.
Hobart Bros., Co., Troy 1, O.
Hobsite Products Co., 835 River St., Paterson 4, N. J.
Hodge Boiler Wks., 99-111 Sumner St., East Boston 28, Mass.
Hodgman Mfg. Co., 135 Washington St., Taunton, Mass.
Hoffman Combustion Engineering Co., 710 Marquette Bldg., Detroit, Mich.
● Hoffman Specialty Co., 1001 York St., Indianapolis 7, Ind.
Hogan & Co., Inc., C. T., 383 Madison Ave., New York 17, N. Y.
Holby Valve Co., 1146 Second Ave., New York 21, N. Y.
Holcomb & Hoke Mfg. Co., Inc., 1545 Van Buren, Indianapolis 7, Ind
Hollands Mfg. Co., Erie, Pa.
Holsclaw Bros., Inc., 418 Willow Rd., Evansville 11, Ind.
Holtum Mfg. Co., Freeport, Ill.
Holtzer-Cabot, Div. The Leland Electric Co., Dayton 1, O.
Homestead Valve Mfg. Co., P. O. Box 348, Coraopolis, Pa.
Hood Refining Co., 182 N. Hamilton Ave., Greensburg, Pa.
Hook & Ackerman, Inc., 18 E. 41st St., New York 17, N. Y.
Hoover Co., Kingston-Conley Div., 68 Brook Ave., North Plainfield, N. J.
Hoppes Mfg. Co., Inc., 850 N. Belmont Ave., Springfield, O.
Horn Co., Inc., A. C., 10th St. & 44th Ave., Long Island City, N. Y.
Horton Mfg. Co., 3016 University Ave., S. E., Minneapolis 14, Minn.
Hossfeld Mfg. Co., 460 W. Third St., Winona, Minn.
Hotpoint Inc., 5600 W. Taylor St., Chicago 44, Ill.
Hotstream Heater Co., 2363 E. 69th St., Cleveland 4, O.
Houghton & Co, E. F., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Howard Iron Wks. & Alberger Heater Div., 287 Chicago St., Buffalo 4, N. Y.
● Howe Ice Machine Co., 2825 Montrose Ave., Chicago 18, Ill.
Howell Electric Motors Co., Howell, Mich.
Howes-Woods Co., 201 Bridge St., Cambridge, Mass.
Hubbell Corp., 319 N. Albany Ave., Chicago 12, Ill.
Humboldt Mfg. Co., 2016 N. Whipple St., Chicago, Ill.
Hunt & Son, C. B., Inc., Salem, O.
Hunter Fan & Ventilating Co., Inc., 400 S. Front St., Memphis, Tenn.
Hupp Corp., Globe Stamping Div., 1250 W. 76th St., Cleveland 2, O.
Huron Boiler Co., 12436 Van Dyke Ave., Detroit 34, Mich.
Hussey & Co., C. G., 2850 Second Ave., Pittsburgh 19, Pa.
Huyette Co., Inc., Paul B., 401 N. Broad St., Philadelphia 8, Pa.
Hyatt Bearings Div., General Motors Corp., Harrison, N. J.
Hydro-Aire, Inc., 3000 Winona, Burbank, Calif.
Hypro Engineering Co., 440 N. Washington Ave., Minneapolis, Minn.

I

Ideal Electric & Mfg. Co., E. First & Oak Sts., Mansfield, O.
Ideal Industries, Inc., 1096 Parke Ave., Sycamore, Ill.
Iden Mfg. Co., 1809 N. Milwaukee Ave., Chicago 47, Ill.
Ilg Electric Ventilating Co., 2841 N. Crawford Ave., Chicago 41, Ill.
● Illinois Engineering Co., 2035 S. Racine Ave., Chicago 8, Ill.
Illinois Malleable Iron Co., 1801 Diversey Parkway, Chicago 14, Ill.
Illinois Oil Products, Inc., 4th Ave. and 24th St., Rock Island, Ill.
● Illinois Testing Laboratories, Inc., 420 N. La Salle St., Chicago 10, Ill.
Illinois Zinc Co., 2959 W. 47th St., Chicago 32, Ill.
Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago 7, Ill.

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Imperial Electric Co., 64 Ira Ave., Akron, O.
Independent Pneumatic Tool Co., 753 Claim, Aurora, Ill.
● Independent Register Co., 3747 E. 93rd St., Cleveland 5, O.
Indiana Fan Company, 427 S. Alabama St., Indianapolis 4, Ind.
Industrial Engineering Corp., Terre Haute, Ind.
Industrial Engineering & Equipment Co., 711 S. Theresa Ave., St. Louis 3, Mo.
Industrial Mfg. & Engineering Co., 3845 N. Ravenswood Ave., Chicago 13, Ill.
Industrial Metal Protectives, Inc., 11 W. Monument Bldg., Rm. 314, Dayton, O.
Industrial Screw Co., 711 W. Lake St., Chicago 6, Ill.
Industrial Service Laboratories, 7656 W. Forest Home Ave., Milwaukee, 14, Wis.
● Industrial Sound Control, Inc., 45 Granby St., Hartford, Conn., and 2119 Sepulveda Blvd., Los Angeles, Calif.
● Infra Insulation, Inc., 10 Murray St., New York, N. Y.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Ingersoll Steel Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Inland Steel Products Co., P. O. Box 393, Milwaukee 1, Wis.
Inner-Tite Div. of Yara Engineering Corp., 18 W. Jersey St., Elizabeth 4, N. J.
Instant Drying Corp., 101 Park Ave., New York, N. Y.
Insto-Gas Corp., 1977 E. Woodbridge St., Detroit 7, Mich.
Instrument Associates. Inc., 134 Broadway, Brooklyn 11, N. Y.
Insulite Div. Minnesota and Ontario Paper Co., 500 Baker Arcade Bldg., Minneapolis 2, Minn.
Insul-Wool Insulation Corp., 121 N. Dodge, Wichita 12, Kans.
Inter-Coastal Paint Corp., 13th St. and Southern R. R., East St. Louis, Ill.
Interchemical Corp., Finishes Div., 57 State St., Newark 1, N. J.
International Boiler Works Co., East Stroudsburg, Pa.
International Engineering, Inc., 1145 Bolander Ave., Dayton 1, O.
International Engineering Wks., Inc., Box 71, Framingham, Mass.
International Heater Co., 101 Park Ave., Utica 2, N. Y.
International Metal Products Co., Phoenix, Ariz.
International Moistening Co., 489 S. Main St., Providence, R. I.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y
International Nutyp Tool Co., 68 W. First St., Oswego, N. Y.
International Powder Metallurgy Inc., Ridgway, Pa.
International Register Co., 2624 W. Washington Blvd., Chicago 12, Ill.
International Sales Co., 2045 Evans Ave., San Francisco 24, Calif.
International Steel Co., 1545 Edgar St., Evansville, Ind.
International Vermiculite Co., Girard, Ill.
Interstate Sales Co., 123 E. 18th St., New York 3, N. Y.
Iona Ventilator Co., Inc., 2821-29 W. Dauphin St., Philadelphia 32, Pa.
Iron Fireman Mfg. Co., 3170 W. 106 St., Cleveland 11, O.
Iron Lung Ventilator Co., 4019 Prospect Ave., Cleveland 3, O.
Irving Flexible Coupling Co., Inc., 1516 W. Slauson Ave., Los Angeles 44, Calif.
Irvington Varnish and Insulator Co., 6 Argyle Terrace, Irvington 11, N. J.
Iwan Brothers, Inc., 1503 Prairie Ave., South Bend 14, Ind.

J

J O Mfg. Co., 8442 Otis St., South Gate, Calif.
Jabsco Pump Co., 2031 Lincoln St., Burbank, Calif.
Jack & Heintz Precision Industries, Inc., Cleveland 1, O.
Jackson Co., Byron, P. O. Box 2017, Terminal Annex, Los Angeles 54, Calif.
Jackson Co., Thomas M., 614 Michigan Bldg., Detroit 26, Mich.
Jackson & Church Co., 321 N. Hamilton Ave., Saginaw 65, Mich.
Jacobs Co., B. & J., 1729 John St., Cincinnati 14, O.
Jacuzzi Bros., Inc., 5327 Jacuzzi Ave., Richmond, Calif.
Jaden Mfg. Co., 1601 Second St., Hastings, Neb.
Jamieson Mfg. Co., 819 Bedford, Dallas, Tex.
● Jan Air, Inc., Richmond, Ill.
Janette Mfg. Co., 556 W. Monroe St., Chicago 6, Ill.
Jarecki Mfg. Co., 1345 W. 12th St., Erie, Pa.
Jefferson Electric Co., 25th & Madison St., Bellwood, Ill.
● Jefferson Union Co., 607 W. 26th St., New York 1, N. Y.
Jeffrey Mfg. Co., 859 N. Fourth St., Columbus 16, O.
● Jenkins Bros., 80 White St., New York 13, N. Y.
Jenn Air Products Co., 409 Architects Bldg., Indianapolis, Ind.
Jennison Co., 87 Putnam St., Fitchburg, Mass.
Jessop Steel Co., Washington, Pa.
Jewel Mfg. Co., 1841 University Ave., St. Paul 4, Minn.
Johns-Manville, 22 E. 40th St., New York 16, N. Y.
Johnson Bronze Co., 460 S. Mill St., New Castle, Pa.
Johnson Co., Lloyd S., 2241 Indiana Ave., Chicago 16, Ill.
Johnson Co., S. T., 401 N. Broad St., Philadelphia 8, Pa.
Johnson Corp., The, 806 Wood St., Three Rivers, Mich.
Johnson Gas Appliance Co., 520 "E" Ave., N. W., Cedar Rapids, Ia.
Johnson Heater Corp., 12 Newhall Ave., Saugas, Mass.
Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
● Johnson Service Co., 507 E. Michigan St., Milwaukee 2, Wis.
Johnston Bros., Inc., Perrysburg, Mich.
Johnston & Chapman Co., 2925 Carroll Ave., Chicago 12, Ill.
Johnston & Jennings Co., 877 Addison Rd., Cleveland 14, O.
Johnston Foil Mfg. Co., 6100 S. Broadway, St. Louis 11, Mo.
Joliet Chemicals, Inc., Industry Ave., Joliet, Ill.
Jones Foundry & Machine Co., W. A., 4401 Roosevelt Rd., Chicago 24, Ill.
Jones & Laughlin Steel Corp., Third Ave. & Ross St., Pittsburgh 30, Pa.
Jordan & Co., Inc., Paul R., 311 E. South St., Indianapolis 4, Ind.
● Joy Mfg. Co., Henry W., Dept. 20, Oliver Bldg., Pittsburgh 22, Pa.
Justrite Mfg. Co., 2061 N. Southport Ave., Chicago, Ill.
Justus Steam Trap Co., Napanoch, N. Y.

K

Kainer & Co., 763 W. Lexington St., Chicago 7, Ill.
● Kaiser Aluminum & Chemical Corp., 1924 Broadway, Oakland 12, Calif.
Kaiser Co., E. B., 625 Webster Ave., Chicago 14, Ill.
Kaiser Co., H. S., 3336 Franklin Blvd., Chicago, Ill.
Kane Mfg. Corp., Kane, Pa.
Kauffman Air Conditioning Corp., 4505 Olive St., St. Louis 8, Mo.
Kaufman Co., H. J., The, 13215 Roselawn Ave., Detroit 4, Mich.
Kaye & McDonald, Inc., 11-15 Central Ave., West Orange, N. J.
Keasbey Co., Robert A., 139-149 W. 19th St., New York, N. Y.
Keasbey & Mattison Co., Butler Ave., Ambler, Pa.
Keckley Co., O. C., 400 W. Madison St., Chicago 6, Ill.
Keeler Co., E., 238 West St., Williamsport 3, Pa.
Keeney Mfg. Co., Main St., Newington 11, Conn.
Kehm Corp., The, 135 S. La Salle St., Chicago 3, Ill.
Keller Tool Co., P. O. Box 268, Grand Haven, Mich.
Kellogg Co., M. W., The, 225 Broadway, New York 7, N. Y.
Kelley Koett Mfg. Co., The, 212 W. 4th St., Covington, Ky.
Kelvin-White Co., 90 State St., Boston 9, Mass.
Kelvinator Div., Nash-Kelvinator Corp., 14250 Plymouth Rd., Detroit 32, Mich.
Kenite Laboratory, Inc., 100 Kings Rd., P. O. Box 268, Madison, N. J.
● Kennard Corp., 1819 S. Hanley Rd., St. Louis 17, Mo.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Kensico Tube Co., Mt. Kisco, N. Y.
Kerentoff, G. L., 2218 Reading Rd., Cincinnati 2, O.
Kern Co., John A., 224 N. Loomis St., Chicago 7, Ill.
Kernchen Co., 333 N. Michigan, Chicago, Ill.
Kerotest Mfg. Co., 2525 Liberty Ave., Pittsburgh 22, Pa.
Kester Solder Co., 4201 Wrightwood Ave., Chicago 39, Ill.
● Kewanee Boiler Corp., Franklin St. and "Q" Tracks, Kewanee, Ill.
● Key Co., 2617 McCasland, East St. Louis, Ill.
Keystone Asphalt Products Co., 43 E. Ohio St., Chicago 11, Ill.
Keystone Carbon Co., Inc., St. Marys, Pa.
Kidder Mfg. Co., Inc., J. F., 426 Colchester Ave., Burlington, Vt.
Kieley & Mueller, Inc., 2015 43rd St., North Bergen, N. J.
Kimberly-Clark Corp., Neenah, Wis.
Kindl-Air Corp., 1480 W. 112th St., Cleveland, Ohio
Kinetic Chemicals, Inc., 10th & Market Sts., Wilmington 98, Del.
● King Co., The, 928 N. Cedar St., Owatonna, Minn.
King Engineering Corp., 945 Willard Ave., Ann Arbor, Mich.
King Union Co., Inc., Hillsgrove, R. I.
Kingsford Foundry & Machine Wks., 264 W. Second St., Oswego, N. Y
Kingston Products Corp., 1415 N. Webster, Kokomo, Ind.
Kinney Mfg. Co., 3529 Washington St., Boston 30, Mass.
Kirk & Blum Mfg. Co., 2838-52 Spring Grove Ave., Cincinnati, O.
Kisco Boiler & Engineering Co., 2414 Dekalb St., St. Louis 4, Mo.
Klauer Mfg. Co., 9th and Washington Sts., Dubuque, Ia.
Kleenaire Corp., 409 Jefferson St., Stevens Point, Wis.
Kleen-Heet, Inc., 1823 Carroll Ave., Chicago 12, Ill.
Klenk's Aviation Snips, 107 E. 5th St., Wilmington, Del.
Kling Bros. Engineering Works, 1320 N. Kostner Ave., Chicago 51, Ill.
Klingerit, Inc., 16-22 Hudson St., New York 13, N. Y.
Klipfel Valves, Inc., Div. of Hamilton-Thomas Corp., 1000 Weiler Ave., Hamilton, O.
Klomparens Lock-Joint Mfg. Co., Inc., 4600 Bowen Rd., S. E., Washington 19, D. C.
Kluegel & Co., E., 187 W. Kellogg Blvd., St. Paul, Minn.
Knickerbocker Co., 603 Liberty St., Jackson, Mich.
Knight, Maurice A., Kelly Ave., Akron 9, O.
Knowles Mushroom Ventilator Co., 583 Upper Mountain Ave., Upper Montclair, N. J.
Kol-Master Corp., 161 Walberg St., Oregon, Ill.
Kold-Hold Mfg. Co., Lansing 4, Mich.
Kopperman & Sons, Joseph, 316 New St., Philadelphia 6, Pa.
Koppers Co., Inc., Koppers Bldg., Pittsburgh 19, Pa.
Korfund Co., Inc., 48-01-F 32nd Pl., Long Island City 1, N. Y.
Koven & Bro., L. O., Inc., 154 Ogden Ave., Jersey City 7, N. J.
Kraissl Co., Inc., The, Terhune and Williams Aves., Hackensack, N. J.
Kramer Trenton Co., N. Olden & Bruening Aves., Trenton 5, N. J.
Kraus Co., Walter S., 48-02 43rd St., Woodside, L. I., N. Y.
Krehbiel Co., J. H., 425 N. Crawford Ave., Chicago, Ill.
● Kritzer Radiant Coils, Inc., 2901 W. Lawrence Ave., Chicago 25, Ill.
Kreger Sentry Gauge Co., 1056 W. Mason St., Green Bay, Wis.
Kuhns Bros. Co., 1800 McCall St., Dayton 8, O.
Kunkle Valve Co., 121 S. Clinton St., Ft. Wayne 2, Ind.
Kwikon Co., 1850 W. Washington, Chicago 12, Ill.

L

La Bour Co., Inc., The, 1301 Sterling Ave., Elkhart, Ind.
Laclede-Christy Co., 411 N. Seventh St., St. Louis 1, Mo.
Laclede Steel Co., Arcade Bldg., Rm. 1317, St. Louis 1, Mo.
Laclede Stoker Co., 4438 Hunt Ave., St. Louis 10, Mo.
La Crosse Steel Roofing & Corrugating Co., 227 Jay St., La Crosse, Wis.
● Ladish Co., 5300 S. Packard Ave., Cudahy, Wis. (Milwaukee Suburb).
Lake Chemical Co., 3052 W. Carroll Ave., Chicago 12, Ill.
Lamb Electric Co., Kent, O.
Lammert & Mann Co., Wood & Walnut Sts., Chicago 12, Ill.
Lamson & Sessions Co., 1971 W. 85th St., Cleveland, O.
Lancaster Heat Transfer Co., Inc., 123 DeKalb Ave., Brooklyn, N. Y.
Landis & Gyr, Inc., 104 Fifth Ave., New York 11, N. Y.
Landis Machine Co., Inc., Fifth and Church Sts., Waynesboro, Pa.

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Larkin Packer Co., 6200 Maple Ave., St. Louis 14, Mo.
Larkin Coils, 519 Memorial Dr., S. E., Atlanta 1, Ga.
Lastik Products Co., Inc., 1106 Keenan Bldg., Pittsburgh 22, Pa.
Lau Blower Co., 2001 Home Ave., Dayton 7, O.
Lawler Automatic Controls, Inc., 453 N. MacQuesten Pkwy., Mount Vernon, N. Y.
Lawrence Pump & Engine Co., P. O. Box 70, Lawrence, Mass.
Layne & Bowler, Inc., Box No. 6815, Hollywood Sta., Memphis 8, Tenn.
Leach Relay Co., 5919 Avalon Blvd., Los Angeles 3, Calif.
Lead Lined Iron Pipe Co., 1 Broadway, Wakefield, Mass.
Leavitt Machine Co., East River St., Orange, Mass.
Lecourtenay Co., 5 Maine St., Newark 5, N. J.
Lee Co., K. O., Aberdeen, S. D.
● Lee Engineering Co., 95 River St., Hoboken, N. J.
Lee & Son, Thomas, 128-132 W Second St., Cincinnati 2, O.
Leeds & Northrup Co., 4970 Stenton Ave., Philadelphia 44, Pa.
Lees, John, Div., The, Serrick Corp., Batavia St. and Kilgore Ave., Muncie Ind.
Leffel & Co., James, 426 East St., Springfield, O.
Lehigh Fan & Blower Co., Front & Linden Sts., Allentown, Pa.
Lehigh Mfg. Co., Div. of Lehigh Foundries, Inc., Lancaster, Pa.
Leinweber Propellers, 8448 Crandon, Chicago, Ill.
Leland Electric Co., 1501 Webster St., Dayton 1, O.
Lenk Mfg. Co., 30 Cummington St., Boston 15, Mass.
Lennox Furnace Co., Marshalltown, Ia., Syracuse, N. Y., and Columbus, Ohio
Leonard Precision Products Co., 1100 Larson Ave., Garden Grove, Calif.
Leonard Valve Co., Elmwood Station, Providence 7, R. I.
Leslie Co., Valley Brook & Grant Aves., Lyndhurst, N. J.
Leslie Welding Co., 2943 Carroll Ave., Chicago 12, Ill.
Levow, David, 308 W. 20th St., New York 11, N. Y.
Lewellen Mfg. Co., Columbus, Ind.
Lewin-Mathes Co., Lewin Metals Div., 1111 Chouteau Ave., St. Louis 2, Mo.
Lewis & Co., Inc., Chas. S., 2207 Pine St., St. Louis 3, Mo.
Lewis & Co., Joseph E., 1319 Carroll St., Baltimore, Md.
Lexington Supply Co., 4815 Lexington Ave., Cleveland 3, O.
Leyman Mfg. Corp., John H. McGowan Co. Div., 1416 First National Bank Bldg., Cincinnati 2, O.
Libbey-Owens-Ford Glass Co., Nicholas Bldg., Toledo 3, O.
Libert Machine Co., 324 N. Roosevelt St., Green Bay, Wis.
Liberty Motors & Engineering Corp., Coolidge & Constance Aves., Arbutus, Baltimore 29, Md.
Lieblich Oil Burner Inc., 36 W. 66th St, New York, N. Y.
Lientz Co., B. P., P. O. Box 2275, Kansas City, Mo.
● Lilie-Hoffmann Cooling Towers, Inc., 4239 Duncan Ave., St. Louis 10, Mo.
Lima Electric Motor Co., Lima, O.
● Lincoln Electric Co., The, 12818 Coit Rd., Cleveland 1, O.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Lindsay Structure, Inc., 5000 W. Dempster St., Skokie, Ill.
Linear Incorporated, N. W. Cor. State Rd. & Levick St., Philadelphia 35, Pa.
Link-Belt Co., 307 N. Michigan Ave., Chicago 1; 300 W. Pershing Rd., Chicago 9, Ill., 519 N. Holmes Ave. and 220 S. Belmont Ave., Indianapolis 6, Ind., 2045 W. Hunting Park Ave., Philadelphia 40, Pa.
Lintern Co., 60 Lincoln Ave., Berea, O.
Liquid Carbonic Corp., 3100 S. Kedzie Ave., Chicago 23, Ill.
Liquid Conditioning Corp., Sub. of Cochrane Corp,, 17th St. below Alleghany Ave., Philadelphia 32, Pa.
Liquidometer Corp., 37-15 Skillman Ave., Long Island City 1, N. Y.
Lissberger & Son, Inc., Marks, 23-01 Borden Ave., Long Island City, N. Y.
Lithgow Corp., 333 W. 40th Pl., Chicago 9, Ill.
Little Giant Vaporizer Co., Inc., 5105 Classen Blvd., P. O. Box 3535, Oklahoma City 6, Okla.
Little Mfg. Co., M. S., 151 New Park Ave., Hartford 6, Conn.
Littleford Bros., Inc., 453 E. Pearl St., Cincinnati 2, O.
Livingstone Engineering Co., 100 Grove St., Worcester 5, Mass.
Locke Regulator Co., Walter and Osborne Sts., Salem, Mass.
Lockformer Co., The, 4615 W. Roosevelt Rd., Chicago 50, Ill.
Lockjoint Wood Products Co., 1114 S. Santa Fe, Wichita 11, Kan.
Locknut Corp. of America, 3403 W. 47th St., Chicago 32, Ill.
Lockport Cotton Batting Co., Lockport, N. Y
Logan Engineering Co., Lawrence & Lamon Ave., Chicago 30, Ill.
Loline Steel Boiler Co., 235 Penn St., Allentown, Pa.
Lonergan Co., J. E., 2nd and Race Sts., Philadelphia 6, Pa.
Long Mfg., Div. Borg-Warner Corp., 12501 Dequindre St., Detroit, Mich.
Lookout Boiler & Mfg. Co., Compress St. & Mfrs. Rd., Chattanooga 1, Tenn.
Lord Mfg. Co., 1635 W. 12th St., Erie, Pa.
Louisville Drying Machine Div., General American Transportation Corp., Hoffman Bldg., 4th & Market Sts., Louisville, Ky.
Lovejoy Flexible Coupling Co., 5081 W. Lake St., Chicago 44, Ill.
Lowell Wrench Co., 54 Commercial St., Worcester 8, Mass.
Loyal Knight Stokers, Inc., 800 Scheel St., Belleville, Ill.
Ludlow Valve Mfg. Co., Inc., Foot of Adams St., Troy, N. Y.
Lufkin Rule Co., Saginaw, Mich.
Lukens Steel Co. and Divisions, 308 S. First Ave., Coatesville, Pa.
Lumm Co., A. H., 2512 Albion St., Toledo 6, O.
Lumsden & Van Stone, Div. of Midwest Piping & Supply Co., 426 First St., South Boston 27, Mass.
● Lunkenheimer Co., Waverly & Beekman Sts., Cincinnati 14, O.
Lustra Corp. of America, 36 Washington St., Brooklyn, N. Y.
Luzerne Rubber Co., Muirhead Ave., Trenton 9, N. J.
Lynch Mfg. Corp., 3600 Summit St., Toledo 1, O.
Lynchburg Foundry Co., Peoples Bank Bldg., Lynchburg, Va.
Lyon, Conklin & Co., Inc., McComas & Race Sts., Baltimore 30, Md.

M

M B Mfg. Co., Inc., The, 1060 State St., New Haven 11, Conn.
M-M-A, Inc., Wabank Rd., Lancaster, Pa.
Maas & Waldstein Co., 438 Riverside Ave., Newark 4, N. J.
MacDermid Chemical Co., Bristol, Conn.
Macksons Co., 125 Cedar St., New York 6, N. Y.
Madden Brass Products Co., The, 1111 N. Franklin St., Chicago 10, Ill.
MacLean-Fogg Lock Nut Co., 5535 N. Wolcott Ave., Chicago 40, Ill.
MaGirl Foundry & Furnace Co., 413 E. Oakland Ave., Bloomington, Ill.
Magnetrol, Inc., 2110 S. Marshall Blvd., Chicago 23, Ill.
MagniLastic Div., Cook Electric Co., 2700 Southport Ave., Chicago 14, Ill.
Mahon Co., R. C., 8650 Mt. Elliott Ave., Detroit, Mich.
Mahr Mfg. Co., Div. of Diamond Iron Wks., Inc, 1728 Second St. N., Minneapolis 11, Minn.
● Maid-O'-Mist, Inc., 3217 N. Pulaski Rd., Chicago 41, Ill.
Maintenance Engineering Corp., 3611 Clinton Dr., Houston, Tex.
Majot Automatic Machine Co., Inc., 88 Main St., East Orange, N. J.
Mall Tool Co., 7740 S. South Chicago Ave., Chicago 19, Ill.
Malleable Iron Fittings Co., Branford, Conn.
Mallory Sales Co., 13904 Lincoln Ave., Dolton, Ill.
Manhattan Perforated Metal Co., Inc., 43-17 37th St., Long Island City 1, N. Y.
Manheim Mfg. & Belting Co., Manheim, Pa.
Manitowoc Engineering Wks., 16th & The River, Manitowoc, Wis.
Manning, Maxwell & Moore, Inc., Bridgeport 2, Conn.
Mansfield & Green, 1051 Power Ave., Cleveland 14, O.
Manufacturers Machine Co., Railroad Ave., North Andover, Mass.
Maplewood Machinery Co., Inc., 2634 Fullerton Ave., Chicago 47, Ill.
Marathon Electric Mfg. Corp., Cherry and Randolph Sts., P. O. Box 630, Wausau, Wis.
Marble-Card Electric Co., Gladstone, Mich.
Marco Co., Inc., 3rd & Church Sts., Wilmington 50, Del.
Marine & Industrial Products Co., 3731 Filbert St., Philadelphia 4, Pa.
Marion Machine Foundry & Supply Co., Marion, Ind.
● Marley Co., Inc., The, 3001 Fairfax Rd., Kansas City 15, Kan.
Marlin-Rockwell Corp., Jamestown, N. Y.
● Marlo Coil Co., 6135 Manchester Rd., St. Louis 10, Mo.
Marlow Pumps, Ridgewood, N. J.
Marman Products Co., Inc., 940 W. Florence Ave., Inglewood, Calif.
Marquette Mfg. Co., 401 Johnson St., Minneapolis, Minn.
Marsh Corp., Jas. P., 3501 Howard St., Skokie, Ill.
● Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., 3501 Howard St., Skokie, Ill.
Marsh Valve Co., 4th St., & Brigham Rd., Dunkirk, N. Y.
Marshalltown Mfg. Co., 901 E. Nevada, Marshalltown, Ia.
Martens & Stormoen, 15 Hathaway St., Boston 10, Mass.
Martin Co., Inc., J. O., 637 Minna St., San Francisco 3, Calif.
Martin Fan & Blower Co., 4634 W. 21st Pl., Chicago 50, Ill.
Martin & Sons, H. P., 801 W. 12th St., Owensboro, Ky.
Martin-Quaid Co., 1815 W. Sedgley Ave., Philadelphia 32, Pa.
● Martocello & Co., Jos. A., 229 N. 13th St., Philadelphia 7, Pa.
Masonite Corp., 111 W. Washington St., Chicago 2, Ill.
Mason-Neilan Regulator Co., 1190 Adams St., Boston 24, Mass.
Master Electric Co., 126 Davis Ave., Dayton 1, O.
Master Mechanics Co., 2097 Columbus, Cleveland, O.
Matthiessen & Hegeler Zinc Co., 9th & Sterling Sts., La Salle, Ill.
Maurath, Inc., 21800 Miles Ave., Cleveland 22, O.
Maurey Mfg. Corp., 2911 S. Wabash Ave., Chicago 16, Ill.
May Oil Burner Div., Gerotor May Corp., Maryland Ave. and Oliver, Baltimore 3, Md.
Mayne Products Co., 324 Harries Bldg., Dayton 2, O.
Mayson Mfg. Co., Inc., 4332 Horatio St., Detroit 10, Mich.
Maysteel Products, Inc., 740 N. Plankinton, Milwaukee 3, Wis.
McAlear Mfg. Co., 1921 S. Western Ave., Chicago 8, Ill.
McAuley Trap Co., 405 Penn Ave., Pittsburgh 22, Pa.
● McCord Corp., 2587 E. Grand Blvd., Detroit 11, Mich.
McCorkle Co., D. H., 6th & Bancroft Way, Berkeley 2, Calif.
● McDonnell & Miller, Inc., Wrigley Bldg., 400 N. Michigan Ave., Chicago 11, Ill.
McIntire Connector Co., 263 Jefferson St., Newark 5, N. J.
McKay Co., 1005 Liberty Ave., Pittsburgh 22, Pa.
McLarty Systems, 205 W. Michigan Ave., Battle Creek, Mich.
McLeod & Henry Co., Inc., Troy, N. Y.
McNeill Engineering Co., 4057 W. Van Buren St., Chicago 24, Ill.
McPherson Furnace & Supply Co., 1805 N. E. Second Ave., Portland 12, Ore.
McQuay, Inc., 1600 Broadway, N. E., Minneapolis 13, Minn.
McQuay-Norris Mfg. Co., Southwest Ave. at Marconi, St. Louis 10, Mo.
McRay Products Co., 950 Mission St., South Pasadena 1, Calif.
McWane Cast Iron Pipe Co., 1201 Vanderbilt Rd., Birmingham 2, Ala.
Mears-Kane-Ofeldt, Inc., 1903-1915 E. Hagert St., Philadelphia 25, Pa.
Mechanical Industries Production Co., 217-223 Ash St., Akron 3, O.
Mechanical Products Corp., 168 N. Ogden Ave., Chicago 7, Ill.
Meco, Inc., 4101 S. E. 26th Ave., Portland 2, Ore.
Medart Co., 100 Potomac St., St. Louis 18, Mo.
Meier Electric & Machine Co., Inc., 3525 E. Washington St., Indianapolis 7, Ind.
Mel-Gauge Co., Crest Ave., East Haven, Conn.
Mel Products Co., The, 554 Chapel St., New Haven, Conn.
Meletron Corp., 950 N. Highland Ave., Los Angeles 38, Calif.
Mellish & Murray Co., 1715 Carroll Ave., Chicago 12, Ill.
Merchant & Evans Co., 2035 Washington Ave., Philadelphia 46, Pa.
● Mercoid Corp., The, 4201 Belmont Ave., Chicago 41, Ill.
Mercontrol Inc., 278 Pearl St., New York 7, N. Y.
Meriam Instrument Co., The, 10920 Madison Ave., Cleveland 2, O.
Mesker Steel Corp., Geo. L., 400 N. W. First St., Evansville 8, Ind.
Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.
Metallo Gasket Co., 16 Bethany St., New Brunswick, N. J.

● Advertisement in this issue. See Index to Advertisers, page 120d

Metropolitan Refining Co., Inc., 50-23 Twenty-Third St., Long Island City 1, N. Y.
● Mettler Co., Lee B., 406 S. Main St., Los Angeles 13, Calif.
Meyer & Bro. Co., F., 308 S. Commercial St., Peoria 2, Ill.
Meyer Furnace Co., The, P. O. Box 989, Peoria 1, Ill.
Meyer Mfg. Co., 2536 Fourteenth St., Detroit 16, Mich.
Michigan Pipe Co., 506 Phoenix Bldg., Bay City, Mich.
Micro Products Co., 20 N. Wacker Dr., Chicago 6, Ill.
Micro Switch Div. of First Industrial Corp., 1 E. Spring St., Freeport, Ill.
Midco Register Corp., 1059 Grand Ave., St. Paul, Minn.
● Mid-Continent Metal Products Co., 1960 Clybourn Ave., Chicago 14, Ill.
Midland Paint & Varnish Co., 3802 E. 91st St., Cleveland 5, O.
Mid-States Equipment Co., 2429 S. Michigan Ave., Chicago 16, Ill.
● Mid-States Welder Mfg. Co., 6025 S. Ashland Ave., Chicago 36, Ill.
Midwest Automatic Control Co., 510 Third St., Des Moines, Ia.
● Midwest Piping & Supply Co., Inc., 1415 S. Second St., St. Louis 4, Mo.
Midwest Products Co., Port Byron, Ill.
Miller Electric Mfg. Co., Inc., 718 S. Bounds St., Appleton, Wis.
Miller-Harris Instrument Co, 836 N. 4th St., Milwaukee 3, Wis.
Millers Falls Co., 57 Wells St., Greenfield, Mass.
Mills Corp., Elmer E., 153-159 W. Huron St., Chicago 10, Ill.
Mills Industries, Inc., 4110 W. Fullerton Ave., Chicago, Ill.
● Milton Equipment Co., N. E. Cor. 4th Race St., Philadelphia 6, Pa.
Milwaukee Gas Specialty Co., P. O. Box 461, Milwaukee, Wis.
Milwaukee Valve Co., S. Burrell St. at E. Hayes Ave., Milwaukee 7, Wis.
Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh 8, Pa.
Mineral Insulation Co., 103rd & Southwest Highway, Chicago Ridge, Ill.
Minerallac Electric Co., 25 N. Peoria St., Chicago 7, Ill.
Minimite Co., 3700 W. Roosevelt Rd., Chicago 24, Ill.
● Minneapolis-Honeywell Regulator Co., 2604 4th Ave., S., Minneapolis 8, Minn.
Minneapolis Mining & Mfg. Co, 900 Fauquier Ave., St. Paul, Minn.
Minn-Kota Foundry & Mfg. Co., P. O. Box 822, Fargo, N. D.
● Miracle Adhesives Corp., 214 E. 53rd St., New York 22, N. Y.
Mir-O-Col Alloy Co., Inc., 312 North Ave., 21, Los Angeles 31, Calif.
Misener Mfg. Co., Inc., 200-8 Walton St., Syracuse 2, N. Y.
Mission Appliance Corp., 7101 McKinley Ave., Los Angeles 1, Calif.
Mississippi Glass Co., 200 Fifth Ave., New York 10, N. Y.
Mitchell & Co., Inc., W. K., 29th & Ellsworth, Philadelphia 46, Pa.
Mitchell Mfg. Co., 2525 N. Clybourn Ave., Chicago, Ill.
Modern Engineering Co., 3411 Pine Blvd., St. Louis 3, Mo.
● Modine Mfg. Co., 1509 De Koven Ave., Racine, Wis.
Moeller Instrument Co., 132nd St. & 89th Ave., Richmond Hill 18, N. Y.
Moeschl-Edwards Corrugating Co., Inc., The, P. O. Box 1115, Cincinnati 1, O.
Monarch Mfg. Works, Inc., 2501 E. Ontario St., Philadelphia 34, Pa.
Monash-Younker Co., Inc., 1315 W. Congress St., Chicago 7, Ill.
Moncrief Furnace Co., P. O. Box 1673, Atlanta 1, Ga.
Monitor Controller Co., The, 51 Hayward St., Boston 84, Mass.
Monogram Products Co., 731 N. 35th St., Philadelphia 4, Pa.
Monsanto Chemical Co., 1700 S. Second St., St. Louis 4, Mo.
Monsanto Chemical Co., Merimac Div., Everett Sta., Boston 49, Mass.
Montag Stove & Furnace Wks., 2011 N. Columbia Blvd., Portland 3, Ore.
Montgomery Bros., 1122 Howard St., San Francisco, Calif.
Moore Inc., Goodloe E., 2811 N. Vermilion, Danville, Ill.
● Moore Co., The, Marceline, Mo.
Moore Products Co., H and Lycoming Sts., Philadelphia 24, Pa.
Moraine Products Div., General Motors Corp., Dayton 1, O.
Moran Flexible Joint Co., Inc., 217 W. Main St., Louisville, Ky.
Morehead Mfg. Co., 2455 W. Warren Ave., Detroit 8, Mich.
Moreheat Distribution Inc., 5608 Stewart Rd., Cincinnati 27, O.
Morey, Dan, Box 85, Los Angeles 35, Calif.
Morf Industries, Inc., 780 Manor Rd., Staten Island 2, N. Y.
Morheat Corp., 700 E. Kalamazoo, Lansing, Mich.
Morris Coupling & Clamp Co., 12th and Factory Ave., Elwood City, Pa.
Morris Machine Wks., 50 E. Genesee St., Baldwinsville, N. Y.
Morrison Brothers Co., Dubuque, Ia.
Morrison Products, Inc., E. 168th St. and Waterloo Rd., Cleveland 10, O.
Morse Chain Co., 7601 Central Ave., Detroit 8, Mich.
Morse-Smith-Morse, Inc., 165 Dexter Ave., Watertown 72, Mass.
Mortell Co., J. W., Kankakee, Ill.
Motionair Co., 3319 E. Slauson Blvd., Los Angeles 11, Calif.
Mouat Vapor Heating Co., The, 1246-1254 W. 4th St., Cleveland 13, O.
● Mt. Hawley Mfg. Co., Inc., Peoria, Ill.
Mountain States Equipment Co., 1238 Speer Blvd., Denver 4, Colo.
Muckle Mfg. Co., Owatonna 3, Minn.
Mueller Brass Co., Port Huron, Mich.
Mueller Co., 512 W. Cerro Gordo St., Decatur, Ill.
● Mueller Furnace Co., L. J., 2005 W. Oklahoma Ave., Milwaukee 7, Wis.
Mueller Steam Specialty Co., Inc., 40-20 22nd St., Long Island City 1, N. Y.
Multi-Cell Sales Corp., 3420 Nicollet Ave., Minneapolis 8, Minn.
● Multi-Vent Div., Pyle-National Co., The, 1373 Kostner Ave., Chicago 51, Ill.
Muncie Gear Wks., Inc., 700 N. Wysor, Muncie, Ind.
● Mundet Cork Corp., 7101 Tonnelle Ave., North Bergen, N. J.
Mundt & Sons, Charles, 53 Fairmount Ave., Jersey City 4, N. J.
Munn & Steele, Inc., 130 Lister Ave., Newark 5, N. J.
Munton Mfg. Co., 9400 Belmont Ave., Franklin Park, Ill.
Murray Iron Wks. Co., 1106 Washington St., Burlington, Ia.
● Murray Mfg. Co., D. J., 1002-24 Third St., Wausau, Wis.
Myers & Bro. Co., F. E., The, Ashland, O.
Myers Electric Co., Inc., 209 First Ave., Pittsburgh 22, Pa.
Mystik Adhesive Products Div., Chicago Show Printing Co., 2635 N. Kildaire, Chicago 39, Ill.

N

● Nash Engineering Co., 307 Wilson Ave., South Norwalk, Conn.
Nason Co., 7663 Epworth Blvd., Detroit 4, Mich.
Nat Corp., 2710 McGee St., Kansas City 8, Mo.
National Acme Co., The, 170 E. 131st St., Cleveland 8, O.
National Air Conditioning Inc., Johnstown, Pa.
National Airoil Burner Co., Inc., 1284 E. Sedgley Ave., Philadelphia 34, Pa.
National Aluminate Corp., 6215 W. 66th Pl., Chicago 38, Ill.
National Aniline Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.
National Carbon Co., 30 E. 42nd St., New York 17, N. Y.
National Cylinder Gas Co., 840 N. Michigan Ave., Chicago 11, Ill.
National Engineering & Mfg. Co., 519 Wyandotte, Kansas City 6, Mo.
National Engineering Products, Inc., Commerce and Savings Bldg., Washington, D. C.
National Gas Equipment Co., Inc., Terrell, Tex.
National Gypsum Co., Delaware Ave., Buffalo, N. Y.
National Heater Co., 2182 Cleora Ave., St. Paul 4, Minn.
National Lead Co., 111 Broadway, New York 6, N. Y.
National Lining Co., 326 W. Washington, Chicago, Ill.
National Lock Co., Inc., 1902 Seventh St., Rockford, Ill.
● National Metal Fabricators, 2138 S. Sawyer, Chicago 23, Ill.
National Meter Co., 4221 First Ave., Brooklyn 32, N. Y.
National Oil Burner Co. of N. Y. Inc., 614 Bergen St., Brooklyn, N. Y.
National Pipe Bending Co., 122 River St., New Haven 13, Conn.
National Pipe Coatings, Inc., 315 W. 9th St., Los Angeles 15, Calif.
National Radiator Co., The, 221 Central Ave., Johnstown, Pa.
National Steam Pump Co., 701 W. Johnson St., Upper Sandusky, O.
National Time & Signal Corp., 21800 Wyoming Ave., Detroit 20, Mich.
National Tube Co., United States Steel Corp., Subsidiary, Frick Bldg., Pittsburgh 30, Pa.
National Valve & Mfg. Co., 3101 Liberty Ave., Pittsburgh 1, Pa.
National Water Lift Inc., Kalamazoo, Mich.
Naugatuck Mfg. Co., Union City, Conn.
Naylor Pipe Co., 1251 E. 92nd St., Chicago 19, Ill.
Nebel Mfg. Co., P. O. Box 3942, Shaker Square Sta., Cleveland 20, O.
Neilson Chemical Co., 6564 Benson Ave., Detroit 7, Mich.
Nelson Chemical Pumps, Box 2235, Casper, Wyo.
● Nelson Corp., Herman, 1824 Third Ave., Moline, Ill.
Nelson Mfg. Co. B. F., 401 Main St., N. E., Minneapolis 13, Minn.
Nelson Stud Welding, Div. of Morton Gregory Corp., Lorain, O.
Neptune Meter Co., 50 W. 50th St., New York 20, N. Y.
● Nesbitt, Inc., John J., State Rd. & Rhawn St., Philadelphia 36, Pa.
Nevinger Mfg. Co., Inc., Greenville, Ill.
New Albany Machine Mfg. Co., E. 10th & Water Sts., New Albany, Ind.
New Departure Div., General Motors Corp., Bristol, Conn.
● New England Cooling Tower Co., 88 Broad St., Boston 10, Mass.
New Haven Copper Co., Seymour, Conn.
New Jersey Zinc Sales Co., Front & Fletcher Sts., New York 7, N. Y.
New York Air Valve Corp., 611-621 Broadway, New York, N. Y.
● New York Blower Co., 3159 Shields Ave., Chicago 16, Ill.
New York Brass Foundry, 405 Broome St., New York, N. Y.
Newark Boiler Regulator Co., Inc., 15 Ward St., Bloomfield, N. J.
Newark Transformer Co., Linden & Park Ave., Linden, N. J.
Newark Wire Cloth Co., 351 Verona Ave., Newark 4, N. J.
Newcomb-Detroit Co., 5741 Russell St., Detroit 11, Mich.
● Newman Co., Inc., I. C., 30 E. 40th St., New York 16, N. Y.
Newport Steel Corp., Rolling Mill Div., Ninth & Lowell Sts., Newport, Ky.
● Niagara Blower Co., 405 Lexington Ave., Room 3117, New York 17, N. Y.
Niagara Industrial Corp., 20 Vesey St., New York 7, N. Y.
Niagara Machine & Tool Wks., 637-697 Northland Ave., Buffalo 11, N. Y.
Nice Ball Bearing Co., 30th and Hunting Park Ave., Philadelphia 40, Pa.
● Nicholson & Co., W. H., 198 Oregon St., Wilkes-Barre, Pa.
Nikoh Tube Co., 5001 S. Kedzie, Chicago 32, Ill.
Niles Rolling Mill Co., Niles, O.
Noera Mfg. Co., Div. Chase Brass & Copper Co., Waterbury 20, Conn.
Nooter Corp., 1400 S. Second St., St. Louis 4, Mo.
Nordstrom Valve Div., Rockwell Mfg. Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.
Norgren Co., C. A., 222 Santa Fe Dr., Denver 9, Colo.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
Norman Products Co., Inc., 1150 Chesapeake Ave., Columbus, O.
Norristown Magnesia & Asbestos Co., Washington St., Norristown, Pa.
North American Fibre Products Co., The, Standard Bldg., Cleveland 13, O.
North American Mfg. Co., 4455 E. 71st St., Cleveland, O.
North American Philips Co., Inc., 750 S. Fulton Ave., Mt. Vernon, N. Y.
North Penn Co., 32 E. 21st St., New York 10, N. Y.
Northern Blower Co., 6409 Barberton Ave., Cleveland 2, O.
Northern Equipment Co., 1945 Grove Drive, Erie 6, Pa.
Northern Indiana Brass Co., 935 Plum St., Elkhart, Ind.
Northern Steel & Stoker Corp., 3100 Prospect Rd., Peoria 4, Ill.
Northwest Heating, Inc., 1944 N. Lombard, Portland 3, Ore.
Northwest Lead Co., 2700 16th Ave., S. W., Seattle 4, Wash.
Norwin Co., E. Album St., Freeport, Ill.
Norwood Filtration Co., The, 380 Dwight St., Holyoke, Mass.
Nutmeg Chemical Co., 223 State, New Haven, Conn.
Nu-Way Corp., The, 2416 4th Ave., Rock Island, Ill.
Nye Tool Co., 4120-30 Fullerton Ave., Chicago 39, Ill.

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O

OPW Corp., 2735 Colerain Ave., Cincinnati 25, O.
Oakite Products, Inc., 22 Thames St., New York 6, N. Y.
Obear, E. L., 10224 S. Figueroa St., Los Angeles, Calif.
Oberdorfer Foundries, Inc., 3007 Thompson Rd., Syracuse, N. Y.
O'Brien Corp., The, South Bend 21, Ind.
O'Brien Industries, 84 Bishop St., Jersey City 4, N. J.
O'Brien Steam Specialty Co., Inc., 205 Harrison St., Syracuse 2, N. Y.
Ohio Brass Co., 380 N. Main St., Mansfield, O.
Ohio Chemical & Mfg. Co., The, 1400 E. Washington, Madison, Wis.
Ohio Electric Mfg. Co., 5925 Maurice Ave., Cleveland 4, O.
Ohio Foundry & Mfg. Co., Penn R. R. & Slack St., Steubenville, O.
● Ohio Injector Co., 275 Main St., Wadsworth, O.
Ohio Pipe Bending & Machine Co., 3900-3910 Trent Ave., Cleveland 9, O.
Ohio Products Co., 16113 Munn Rd., Cleveland 11, O.
Ohio Valley Hardware & Roofing Co., Evansville, Ind.
Ohl & Son, George A., 159 Oraton St., Newark, N. J.
Ohmlac Paint & Refining Co., Inc., 92 Liberty St., New York 6, N. Y.
Oil Equipment Mfg. Corp., 75 Brewster St., New Haven, Conn.
Oilux Co., 2200 Dwenger Ave., Fort Wayne 4, Ind.
Olsen Testing Machine Co., Tinius, Easton Rd., Willow Grove, Pa.
● Olson & Co., Arthur A., Canfield, O.
O'Neil Irwin Mfg. Co., 800 Jefferson, Lake City, Minn.
Orangeburg Mfg. Co., Orangeburg, N. Y.
Ormsby-Osterman, Inc., 3631 Cass Ave., St. Louis 13, Mo.
● Orr & Sembower, Inc., Box 1138, Reading, Pa.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
Oster Mfg. Co., 2057 E. 61st Pl., Cleveland 3, O.
Ostlind Valve, Inc., 601 N. E. 28th Ave., Portland 12, Ore.
Overhead Heaters, Inc., Trese, Detroit, Mich.
OverSpred Stoker Co., 77 Washington St., Suite 1702, Chicago 2, Ill.
● Owens-Corning Fiberglas Corp., 1911 Nicholas Bldg., Toledo 1, O.
Ozalid Div. of General Aniline & Film Corp., 1505 Ansco Rd., Johnson City, N. Y.
Ozone Air Co., 1132 Division Ave., S., Grand Rapids 7, Mich.

P

Paasche Airbrush Co., 1909 Diversey Parkway, Chicago 14, Ill.
Pacific Lumber Co., The, 100 Bush St., San Francisco 4, Calif.
Pacific Mfg. Co., 7500 Stanton Ave., Cleveland 4, O.
Pacific Pumping Co., 9201 San Leandro Blvd., Oakland, Calif.
Pacific States Felt & Mfg. Co., Inc., 845 Howard St., San Francisco, Calif.
Pacific Steel Boiler Div., United States Radiator Corp., 300 Buhl Bldg., Detroit 31, Mich.
Pacific Tube Co., 5710 Smithway St., Los Angeles 22, Calif.
Packless Metal Products Corp., 31 Winthrop Ave., New Rochelle, N. Y.
Page Steel & Wire, Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Paine Co., 2951 W. Carroll Ave., Chicago 12, Ill.
Pains Fireworks Display Co., Inc., 11 Park Pl., New York 7, N. Y.
Palmer Electric Co., 20 Sproat St., Detroit 1, Mich.
Palmer Mfg. Corp., 2200 W. Filmore St., Phoenix, Ariz.
Palmer Thermometers, Inc., 2501 Norwood Ave., Cincinnati (Norwood) 12, O.
Palnut Co., 73 Cordier St., Irvington, N. J.
Pan-American Engineering Co., 820 Parker St., Berkeley 2, Calif.
Panelyte Div., St. Regis Paper Co., 230 Park Ave., New York 17, N. Y.
Pangborn Corp., 400 Pangborn Blvd., Hagerstown, Md.
Pan-L-Heat Corp., 2838 N. E. Columbia Blvd.. Portland 11, Ore.
Paraffine Cos., Inc., The, Insulation Div., 475 Brannon St., San Francisco 19, Calif.
Paragon Electric Co., 1600 Twelfth St., Two Rivers, Wis.
Paragon-Revolute Corp., 61 South Ave., Rochester 4, N. Y.
Paramount Products Co., 545 Fifth Ave., New York, N. Y.
Parker Appliance Co., The, 17325 Euclid Ave., Cleveland 12, O.
Parker-Kalon Corp., 200 Varick St., New York 14, N. Y.
Parks-Cramer Co., P. O. Box 444, Fitchburg, Mass.
Patrol Valve Co., The, 2310 E. Superior Ave., Cleveland 14, O.
Patten Co., J. V. 500 De Kalb Ave., Sycamore, Ill.
Patterson-Ballagh Corp., 1900 E. 65th St., Los Angeles, Calif.
Patterson-Kelley Co., Inc., The, 107 Warren St., East Stroudsburg, Pa.
Paul-Lewis Laboratories, Inc., 4253 N. Port Washington Rd., Milwaukee 12, Wis.
Paul Valve Corp., 683 Third Ave., New York 17, N. Y.
Payne Furnace Div., Affiliated Gas Equipment, Inc., 801 Royal Oaks Ave., Monrovia, Calif.
Peabody Engineering Corp., 580 Fifth Ave., New York 19, N. Y.
Pease Co., C. F., The, 2601 W. Irving Park Rd., Chicago 18, Ill.
Peck & Harvey, 5736 N. Western Ave., Chicago 45, Ill.
Peck, Stow & Wilcox Co., Center St., Southington, Conn.
Pecora Paint Co., Inc., 4th St., and Penna. R. R., Philadelphia 40, Pa.
Pedrick Tool & Machine Co., 3640 N. Lawrence St., Philadelphia 40, Pa.
Peer, Inc., 1440 Milton St., Benton Harbor, Mich.
Peerless of America, Inc., 2901 Lawrence Ave., Chicago 25, Ill.
Peerless Electric Co., 1401 W. Market St., Warren, O.
Peerless Pump Div., Food Machinery & Chemical Corp., 301 West Ave., 26, Los Angeles 31, Calif.
Peerless Unit Ventilation Co., Inc., 810 Union Ave., Bridgeport, Conn.
Penberthy Injector Co., 1242 Holden Ave., Detroit 2, Mich.
Penn Brass & Copper Co., 3800 W. 20th St., Erie, Pa.
Penn Electric Switch Co.. P. O. Box 556, Goshen, Ind.
Penn Galvanizing Co., 2201 E. Tioga St., Philadelphia 34, Pa.
Penn Industrial Instrument Corp., 3116 N. 17th St., Philadelphia, Pa.
Penn Mfg. Corp. of Washington, Pa., 380 W. Chestnut St., P. O. Box 484, Washington, Pa.
Penn Ventilating Co., Goodman above Allegheny Ave., Philadelphia 40, Pa.
Pennsylvania Engineering Wks., 526 S. Jefferson St., New Castle, Pa.
Pennsylvania Flexible Metallic Tubing Co., 72nd St. & Powers Lane, Philadelphia 42, Pa.
Pennsylvania Forge Co., Milnor & Bleigh Sts., Philadelphia, Pa.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Pennsylvania Salt Mfg. Co., Widener Bldg., Philadelphia 7, Pa.
% Proportioneers, Inc. %, 156 Codding St., Providence 1, R. I.
Perfect Circle Corp., Hagerstown, Md.
Perfection Grate & Stoker Co., 4 Fisk Ave., Springfield 7, Mass.
Perfection Refrigeration Parts Co., Harvey, Ill.
Perfex Corp., 500 W. Oklahoma Ave., Milwaukee 7, Wis.
Perkins Machine Co., 4 Perkins Ave., Warren, Mass.
Perkins & Son, Inc., B. F., Chicopee St., Holyoke, Mass.
Permatex Co., Inc., 1716-1720 Avenue Y, Brooklyn 29, N. Y.
Permutit Co., 330 W. 42nd St., New York 18, N.Y.
Perolin Co., Inc., 1112 W. 37th St., Chicago 9, Ill.
Peters-Dalton, Inc., 17900 Ryan Rd., Detroit 12, Mich.
Peterson Co., B. A., 300 W. R. R. Ave., Dowagiac, Mich.
Petroleum Heat & Power Co., Stamford, Conn.
Petrometer Corp., 1 Star Sq., Long Island City 1, N. Y.
Pfening Co., Fred D., The, 1075 W. 5th Ave., Columbus 12, O.
Phelps Dodge Copper Products Corp., British-American Tube Div., 40 Wall St., New York 5, N. Y.
Phelps Mfg. Co., 810 Thomas St., Little Rock, Ark.
Pheoll Mfg. Co., 5700 Roosevelt Rd., Chicago 50, Ill.
Philadelphia Gear Works, Inc., Erie Ave. & G St., Philadelphia 34, Pa
Philadelphia Pipe Bending Co., 4135-65 N. Fifth St., Philadelphia 40, Pa.
Philadelphia Thermometer Co., 6th & Cayuga St., Philadelphia 40, Pa
Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.
Phillips & Co., H. A., 3255 W. Carroll Ave., Chicago 24, Ill.
Phillips Cooling Tower Co., Inc., 114 Liberty St., New York 6, N. Y.
Phoenix Brass Fittings Corp., Coit St. & Chancellor Ave., Irvington 11, N. J.
Phoenix Mfg. Co., Joliet, Ill.
Phoenix Ventilator Co., Inc., 1665 63rd St., Brooklyn, N. Y.
Photoswitch, Inc., 77 Broadway, Cambridge 42, Mass.
Photovolt Corp., 95 Madison Ave., New York 16, N. Y.
Pick Mfg. Co., West Bend, Wis.
Pierce Co., Wm. B., The, 277 Military Rd., Buffalo 7, N. Y.
Piezo Mfg. Corp., 110 E. 42nd St., New York 17, N. Y.
Pilley Brush Co., Fort Madison, Ia.
Pines Engineering Co., Inc., 601 Walnut St., Aurora, Ill.
Pioneer Pump & Mfg. Co., 19679 John R. St., Detroit 3, Mich.
Pioneer Roofing & Sheet Metal Co., 226 N. Main St., Muskogee, Okla
Piping Specialties, Inc., 114 Liberty St., New York 6, N. Y.
Piqua Machine & Mfg. Co., Piqua, O.
Piston Ring Div., Koppers Co., Inc., Bush & Hamburg Sts., Baltimore 3, Md.
Pittsburgh Brass Mfg. Co., 3155 Penn Ave., Pittsburgh, Pa.
Pittsburgh Chemical Laboratories, Inc.. 405 Penn Ave., Pittsburgh, Pa.
● Pittsburgh Corning Corp., 4th & Wood Sts., Pittsburgh, Pa.
Pittsburgh Equitable Meter Div., Rockwell Mfg. Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.
Pittsburgh Lectrodryer Corp., 327 32nd St., Pittsburgh 30, Pa.
Pittsburgh Pipe Coil & Bending Co., 61 Bridge St., Etna 23, Pa.
Pittsburgh Piping & Equipment Co., 10 43rd St., Pittsburgh 1, Pa.
Pittsburgh Plate Glass Co., 2000 Grant Bldg., Pittsburgh 19, Pa.
Pittsburgh Steel Co., Grant Bldg., Pittsburgh, Pa.
Pittsburgh Tube Co., 212 Wood St., Pittsburgh 22, Pa.
Pittsburgh Valve & Fittings Co., Barberton, O.
Pittsburgh Water Heater Corp., Box 4452, Pittsburgh 5, Pa.
Plasteel Products Co., McAdams Ave., Washington, Pa.
Plastergon Wall Board Co., Philadelphia Ave., Buffalo 7, N. Y.
Plastic Products Co., 6475 Georgia Ave., Detroit 11, Mich.
Pleasantaire Corp., 734 15th St., Washington 5, D. C.
Plibrico Jointless Firebrick Co., 1800 Kingsbury St., Chicago 14, Ill.
Plumb Mfg. Co., 1925 Dwyer Ave., Utica 3, N. Y.
Plummer Spray Equipment Co., 700 Filmore St., Napoleon, O.
Plymouth Industries, Inc., 1932 Harrison Ave., Plymouth, Ind.
Pocahontas Fuel Co., Inc., Stoker Div., 340 E. 131st St., Cleveland 8, O.
Poe Co., C. W., The, 10530 Wilbur Ave., Cleveland 6, O.
Pokorney Mfg. Co., 3117 Clybourn Ave., Chicago, Ill.
Polaire Cooler Co., Inc., 141 E. Jackson St., Phoenix, Ariz.
Polo Pump Co., Polo, Ill.
● Polyken Industrial Tape Dept., Bauer & Black, Div. of the Kendall Co., 222 W. Adams St., Chicago 6, Ill.
Poole Foundry & Machine Co., 1700 Union Ave., Woodberry, Baltimore 11, Md.
Portable Electric Tools, Inc., 320 W. 83rd St., Chicago 20, Ill.
Porter Co., Inc., H. K., 1932 Oliver Bldg., Pittsburgh 22, Pa.
● Porter & Co., Inc., H. W., 825 Frelinghuysen Ave., Newark 5, N. J.
Positive Control Co., The, 2818 Spring Grove Ave., Cincinnati 25, O.
Potter & Brumfield Sales Co., Princeton, Ind.
Powder Power Tool Corp., Ft. of S. W. Woods St., P. O. Box 1610, Portland 7, Ore.
Powder Weld Process Co., The, 419 Kent Ave., Brooklyn, N. Y.
Powell Co., Wm., The, 2525 Spring Grove Ave., Cincinnati 22, O.
Power Piping Div., Blaw Knox Co., 829 Beaver Ave., Pittsburgh 12, Pa.
● Powers Regulator Co., 2720 Greenview Ave., Chicago 14, Ill.
● Prat-Daniel Corp., 70 Water St., East Port Chester, Conn.
Precision Scientific Co., 3737 Cortland St., Chicago 47, Ill.
Precision Thermometer & Instrument Co., 1506 Brandywine St., Philadelphia 30, Pa.

● Advertisement in this issue. See Index to Advertisers, page 120d

Precision Welder & Machine Co., 138 E. McMicken Ave., Cincinnati 10, O.
Preferred Utilities Mfg. Corp., 1860 Broadway, New York 23, N. Y.
Presstite Engineering Co., 3900 Chouteau St., St. Louis 10, Mo.
● Pritchard & Co., J. F., Equipment Div., 908 Grand Ave., Kansas City 6, Mo.
Proctor & Schwartz, Inc., 7th St. and Tabor Rd., Philadelphia 20, Pa.
Products Research Co., 634 S. Western Ave., Los Angeles 5, Calif.
● Propellair Div., Robbins & Myers Inc., Springfield, O.
Proved Products Mfg. Co., Drawer 1190, San Fernando, Calif.
Prox Co., Inc., Frank, 1201 S. First St., Terre Haute, Ind.
Puhl & Hepper Mfg. Co., Inc., 6400 W. Florissant Ave., St. Louis 20, Mo.
Pur Air Div., American Solvent Recovery Corp., 8th & Cassady Aves., Columbus 3, O.
Pure Carbonic, Inc., 60 E. 42nd St., New York 17, N. Y.
● Pyle-National Co., The, 1373 N. Kostner Ave., Chicago 51, Ill.
Pyott Foundry & Machine Co., 328 N. Sangamon St., Chicago 7, Ill.
Pyrolite Products Co., 1221-1231 W. 74th St., Cleveland 2, O.
Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.

Q

Q-P Mfg. Co., Needham Heights, Mass.
Quaker City Iron Wks., Allegheny & Tulip St., Philadelphia 34, Pa.
Quaker Rubber Corp., Comly & Milnor Sts., Philadelphia 24, Pa.
Quality Specialty Co., Inc., 211 N. 2nd St., Philadelphia 6, Pa.
Quickwork Div., Whiting Corp., Harvey, Ill.
Quigley Co., Inc., 527 Fifth Ave., New York 17, N. Y.
Quijada Tool Co., Inc., 5474-78 Alhambra Ave., Los Angeles 32, Calif.
Quimby Pump Div., H. K. Porter Co., Inc., Oliver Bldg., Pittsburgh 22, Pa.

R

R C S Tool Sales Corp., P. O. Box 1434, Joliet, Ill.
R-S Products Corp., Germantown Ave. at Wayne Junction, Philadelphia 44, Pa.
Radiant Devices, 4030 Chouteau Ave., St. Louis, Mo.
Radiant Heat Sales Engrg. Co., 3841 Broadway, Gary, Ind.
Radiant Utilities Corp., 8817—18th Ave., Brooklyn 14, N. Y.
Radiator Specialty Co., 1700-1900 Dowd Rd., Charlotte 1, N. C.
Raisler Corp., Grimes Sprinkler Div., 129 Amsterdam Ave., New York 23, N. Y.
Ramsey Chain Co., Inc., 1029 Broadway, Albany 1, N. Y.
Ramtite Co., The, 2563 W. 18th St., Chicago 8, Ill.
Ranco, Inc., 601 W. 5th Ave., Columbus 1, O.
● Randall Graphite Bearings, Inc., 609 W. Lake St., Chicago 6, Ill.
Ravena Iron Co., Ravena, N. Y.
Rawlplug Co., Inc., The, 271 Church St., New York 13, N. Y.
Ray Oil Burner Co., 401-499 Bernal Ave., San Francisco 12, Calif.
Raybestos-Manhattan, Inc., 61 Willett St., Passaic, N. J.
Rayfield Co., C. L., 2010-18 S. Halsted St., Chicago 8, Ill.
Raymond Pulverizer Div., Combustion Engineering Co., 1324 N. Branch St., Chicago, Ill.
Raytheon Mfg. Co., Commercial Products Div., Waltham 54, Mass.
● Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Reading Tube Corp., 36-12 47th Ave., Long Island City, N. Y.
Ready-Power Co., The, 11231 Freud Ave., Detroit 14, Mich.
Reco Products Div., Refrigeration Engineering Corp., 2020 Naudain St., Philadelphia, Pa.
Red Jacket Mfg. Co., Davenport, Ia.
Red Spot Electric Co., 7405 S. Tacoma Way, Tacoma 9, Wash.
Redmond Co., Inc., Owosso, Mich.
Reed Unit-Fans, Inc., 1001 St. Charles Ave., New Orleans 8, La.
Reeves Pulley Co., H. P., Columbus, Ind.
Refinite Corp., P. O. Box 354, S. Omaha Station, Omaha 8, Neb.
Refractory & Insulation Corp., 120 Wall St., New York 5, N. Y.
Refrigeration Appliances, Inc., 917-923 W. Lake St., Chicago, Ill.
Refrigeration Economics Co., Inc., 1231 Tuscarawas E., Canton 2, O.
Refrigeration Engineering Inc., 7250 E. Slauson Ave., Los Angeles 22, Calif.
Rega Mfg. Co., 79 Mt. Hope Ave., Rochester 7, N. Y.
● Register & Grille Mfg. Co., Inc., 70 Berry St., Brooklyn 11, N. Y.
Reichert Float & Mfg. Co., 2238 Smead Ave., Toledo 6, O.
Reit-Rexoil, Inc., 27-41 Carroll St., Buffalo 3, N. Y.
Reilly Tar & Chemical Corp., 1615 Merchants Bank Bldg., Indianapolis 4, Ind.
Reiner & Campbell Co., Inc., 667 Norwood Terrace, Elizabeth 2, N. J.
● Reinhard Brothers Co., 11-17 S. 9th St., Minneapolis 2, Minn.
Reintjes Co., Geo. P., 2517-19 Jefferson St., Kansas City, Mo.
Reliable Metal Engineering Co., 4336-4358 S. Knox, Chicago, Ill.
Reliable Perforating Co., 2047 N. Wood St., Chicago, Ill.
Reliable Products Mfg. Co., 123 De Kalb Ave., Brooklyn, N. Y.
Reliance Automatic Lighting Co., 1929 Mead St., Racine, Wis.
Reliance Electric & Engineering Co., 1058 Ivanhoe Rd., Cleveland 10, O.
Reliance Gauge Column Co., 5902 Carnegie Ave., Cleveland 3, O.
Reliance Refrigerating Machine Co., 3401 N. Kedzie Ave., Chicago, Ill.
Remco, Inc., Zelienople, Pa.
● Remington Air Conditioning Div., Remington Corp., Cortland, N. Y.
● Rempe Co., 342 N. Sacramento Blvd., Chicago 12, Ill.
Rensselaer Valve Co., Ontario St., Cohoes, N. Y.
Reps Tool Co., Inc., Box 5, Elmwood Branch, Hartford 10, Conn.
Republic Boiler Corp., 30 Church St., New York 7, N. Y.
Republic Flow Meters Co., 2240 Diversey Pkwy., Chicago 4/, Ill.
Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, O.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Republic Steel Corp., Bolt & Nut Div., 1970 Carter Rd., Cleveland 13, O.
Republic Steel Corp., Steel & Tubes Div., 224 E. 131st St., Cleveland 8, O.
Research Corp., Chrysler Bldg. New York 17, N. Y.
● Research Products Corp., 1015 E. Washington Ave., Madison 10, Wis.
Resisto Pipe & Valve Co., 262 Bridge St., East Cambridge, Mass.
Resistoflex Corp., Belleville 9, N. J.
Reuland Electric Co., 3001 W. Mission Rd., Alhambra, Calif.
Revcor, not Inc., 3227 W. Carroll Ave., Chicago 24, Ill.
● Revere Copper & Brass, Inc., 230 Park Ave., New York 17, N. Y.
Rex Clay Products Co., 14414 Dexter Blvd., Detroit, Mich.
Rex Welder & Engineering Co., 1910 Walnut, Kansas City 8, Mo.
Reynolds Electric Co., 3003 River Rd., River Grove, Ill.
Reynolds Mfg. Co., The, 412 Prospect St., N. E., Grand Rapids, Mich.
Reynolds Mfg. Co., Inc., Springfield, Mo.
Reynolds Metals Co., 2500 S. 3rd St., Louisville 1, Ky.
Reznor Mfg. Co., Mercer 8, Pa.
Rheem Mfg. Co., 570 Lexington Ave., New York 22, N. Y.
Rhoads & Sons, J. E., 35 N. Sixth St., Philadelphia 6, Pa.
Rhode Island Fittings Co., cor. Dexter & Waverly Sts., Providence, R. I.
Rhode Island Humidifier & Ventilator Co., 99 Chauncy St., Boston 11, Mass.
Rhodes, Inc., M. H., 30 Bartholomew Ave., Hartford, Conn.
Richmond Engineering Co., Inc., 7th and Hospital Sts., Richmond, Va.
Richmond Fireproof Door Co., Northwest F St., Richmond, Ind.
Richmond Radiator Co., 19 E. 47th St., New York 17, N. Y.
Richmont, Inc., 2810 E. 11th St., Los Angeles 23, Calif.
● Ric-wiL Co., Union Commerce Bldg., Cleveland 14, O.
● Ridge Tool Co., Clark St., Elyria, O.
Rid-Sludge Div., Aulwood Mfg. Co., 77 Raymond Ave., St. Paul, Minn.
Riggin Metal Products, Inc., Box 267, Kankakee, Ill.
Riggio Co., Frank D., 38 Orient Way, Rutherford, N. J.
Rigidbilt Inc., 2850 W. Fulton St., Chicago 12, Ill.
Rigidized Metals Corp., 658 Ohio St., Buffalo 3, N. Y.
Riley Stoker Corp., 9 Neponset St., Worcester, Mass.
Rinehart Inc., 511-513 Main St., Richmond, Ind.
Ripley Co., Inc., L-R Blower Div., Middletown, Conn.
Ristow, R. E., 2228 S. Atlantic Blvd., Los Angeles 22, Calif.
● Ritter Pattern & Casting Co., Inc., 232 Canal St., New York 13, N. Y.
● Rittling Corp., The, 1292 Niagara St., Buffalo 13, N. Y.
Robbins & Myers, Inc., Lagonda Ave., Springfield, O.
Roberson Co., L. N., 1539 E. 103rd St., Seattle 55, Wash.
Robert Mfg. Co., 9035 Venice Blvd., Los Angeles 34, Calif.
Roberts-Gordon Appliance Corp., 137 Arthur St., Buffalo 7, N. Y.
Roberts Tube Works, 2500 Military Ave., Detroit 9, Mich.
Robertson Co., H. H., 2400 Farmers Bank Bldg., Pittsburgh 22, Pa
Robertson Sons, Inc., M. F., Lansdowne Pa.,
Robinson Aviation, Inc., Vibrashock Div., Teterboro Air Terminal, Teterboro, N. J.
Robinson Industries, Coleman, Mich.
Rochester Lead Works, Inc., 380 Exchange St., Rochester 8, N. Y
Rochester Mfg. Co., Inc., 63 Rockwood St., Rochester 10, N. Y.
Rock Fleece Co., 115 Durango St., El Paso, Tex.
Rock Island Register Co., 2435 Fifth Ave., Rock Island, Ill.
Rockford Screw Products Co., 2501 Ninth St., Rockford, Ill.
Rockwell Co., W. S., 200 Eliot St., Fairfield, Conn.
Rockwood Mfg. Co., Inc., 1801-2001 English Ave., Indianapolis 6, Ind
Rockwood Sprinkler Co., 38 Harlow St., Worcester 5, Mass.
Rodwell Engineering & Sales Co., 4303 Dodge St., Omaha, Neb.
Roessing Mfg. Co., 1616 Noble St., Sharpsburg, Pittsburgh 15, Pa.
Roller Bearing Co. of America, Whitehead Rd., Trenton 3, N. J.
Rolyan Metal Products, 2330 W. 58th St., Chicago 36, Ill.
Rome-Turney Radiator Co., Canal St., Rome, N. Y.
Roots-Connersville Blower Corp., 900 W. Mount St., Connersville, Ind
Roper Corp., Geo. D., Blackhawk Park Ave., Rockford, Ill.
Rosebraugh Co., W. W., 680 S. 17th St., Salem, Ore.
Rosedale Foundry & Machine Co., Columbus & Preble Aves., N. S., Pittsburgh, Pa.
Ross Engineering Corp., J. O., 350 Madison Ave., New York 17, N. Y.
Ross Heater & Mfg. Co., Inc., 1407 West Ave., Buffalo 13, N. Y.
Ross Sprinkler Co., 34 Roberts St., Pasadena 3, Calif.
Ross Valve Mfg. Co., Inc., 6 Oakwood Ave., Troy, N. Y.
Rotary Concrete Drill Co., 650 S. Arroyo Pkwy., Pasadena, Calif.
Rotary Mfg. Co., 5718 Long Beach Ave., Los Angeles, Calif.
Rotary Seal Co., 2020 N. Larrabee St., Chicago 14, Ill.
Roth Co., Roy E., 2484 4th Ave., Rock Island, Ill.
Roto-Beam, 1755 N. Keeler Ave., Chicago 39, Ill.
Rotometals, Inc., 980 Harrison St., San Francisco 7, Calif.
Rotor Corp., Miamisburg, O.
Roy Co., Milton, 1371 E. Mermaid Ave., Philadelphia 18, Pa.
Royal Heaters, Inc., 1024 Westminster Ave., Alhambra, Calif.
Royal Mfg. Corp., Waterloo, Ind.
Royal Ventilator Co., 415 Locust St., Philadelphia 6, Pa.
Royersford Foundry & Machine Co., Inc., 101-131 Main St., Royersford, Pa.
Roylyn, Inc., 716-718 W. Wilson Ave., Glendale 3, Calif.
Rubatex Div., Great American Industries, Inc., Bedford, Va.
Ruberoid Co., 500 Fifth Ave., New York, N. Y.
Ruby Chemical Co., 74 McDowell St., Columbus 8, O.
Ruemelin Mfg. Co., 3860 N. Palmer St., Milwaukee 12, Wis.
Ruggles-Klingemann Mfg. Co., 4 Foster Ct., P. O. Box 550, Salem, Mass
Ruppright, Siegfried, Box 6795, Los Angeles 22, Calif.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Russell Co., F. C., The, 1100 Chester Ave., Cleveland 1, O.
Russell Electric Co., 4501 S. Western Blvd., Chicago 9, Ill.
Russell Mfg. Co., John M., Box 246, Naugatuck, Conn.
Rutland Fire Clay Co., Curtis Ave., Rutland, Vt.
Ruud Mfg. Co., 2934 Smallman St., Pittsburgh 1, Pa.

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S

● SKF Industries, Inc., Front St., & Erie Ave., Philadelphia 32, Pa.
S.O.S. Products Co., Inc., 282 Nassau Ave., Brooklyn, N. Y.
Sac Tool Mfg. Co., 1913 Washington Ave., St. Louis 3, Mo.
St. Clair Rubber Co., 440 E. Jefferson, Detroit, Mich.
St. Louis Blow Pipe & Heater Co., Inc., 1948 N. 9th St., St. Louis 6, Mo.
St. Louis Tool Co., 6100 Prescott St., St. Louis 15, Mo.
St. Paul Corrugating Co., S. Wabasha and Water Sts., St. Paul 1, Minn.
Sales & Co., Murray W., 801 W. Baltimore Ave., Detroit 2, Mich.
Salina Metal Products Co., 9th and Bishop, Salina, Kan.
Sall Bros. Co., 2320 Kishwaukee St., Rockford, Ill.
● Sall Mountain Co., 176 W. Adams St., Chicago 3, Ill.
Salsbury Motors, Inc., 1201 E. Lexington St., Pomona, Calif.
Sampsel Time Control, Inc., Spring Valley, Ill.
San Angelo Foundry & Machine Co., 1000 E. Upton, San Angelo, Tex.
Sandee Mfg. Co., 5050 W. Foster Ave., Chicago, Ill.
Sangamo Electric Co., 1301 N. 11th St., Springfield, Ill.
Santa Fe Tank & Tower Co., 5401 S. Boyle Ave., Los Angeles 11, Calif.
● Sarco Co., Inc., Empire State Bldg., New York 1, N. Y.
● Sarcotherm Controls, Inc., Empire State Bldg., New York 1, N. Y.
Sauereisen Cements Co., Sharpsburg Station, Pittsburgh 15, Pa.
Saunders Machine & Tool Corp., 25 Atherton St., Yonkers, N. Y.
Saval, Inc., 1915 E. 51st St., Los Angeles 11, Calif.
Saverite Engineering Co., 1030 Willow Ave., Hoboken, N. J.
Scaife Co., 26 Ann St., Oakmont, Pa.
Schade Valve Mfg. Co., 2527 N. Bodine St., Philadelphia 33, Pa.
Schaible Co., The, 1086 Summer St., Cincinnati 4, O.
Schatz Mfg. Co., The, Fairview, Poughkeepsie, N. Y.
Schaub Engineering Co., Inc., Fred H., 2110 S. Marshall Blvd., Chicago 23, Ill.
Schecter Brothers Co., Hancock and Huntingdon Sts., Philadelphia 33, Pa.
Schieren Co., Chas. A., 30-38 Ferry St., New York 7, N. Y.
Schild Mfg. Co., 4107 N. 15th St., Milwaukee 9, Wis.
Schmieg Industries, 312-320 Piquette Ave., Detroit 2, Mich.
Schnacke, Inc., 1016 E. Columbia St., Evansville, Ind.
Schneible Co., Claude B., 2827 25th St., Detroit 16, Mich.
Schoedinger, F. O., 322-358 Mt. Vernon Ave., Columbus 16, O.
Schramm, Inc., West Chester, Pa.
Schundler & Co., Inc., F. E., 45-15 Vernon Blvd., Long Island City, N. Y.
Schutte & Koerting Co., 12th and Thompson Sts., Philadelphia, Pa.
Schwitzer-Cummins Co., 1125 E. 22nd St., Indianapolis 7, Ind.
Sciaky Bros. Inc., 4915 W. 67th St., Chicago 38, Ill.
Scientiae Tool Co., 103 Pine, Dayton 2, O.
Scientific Instrument Co., 1041 Second Ave., Detroit 26, Mich.
Scott-Newcomb, Inc., 1922 Pine St., St. Louis, Mo.
Scott Valve Mfg. Co., 3963 McKinley Ave., Detroit 8, Mich.
Scovill Mfg. Co., Waterbury 91, Conn.
Scully Signal Co., 88 First St., Cambridge 41, Mass.
Sealed Power Corp., 500 Sanford St., Muskegon 61, Mich.
Sealol Corp., 45 Willard Ave., Providence 5, R. I.
Seamless Rubber Co., Industrial Tape Div., New Haven, Conn.
Seamlex Co., Inc., 41-23 24th St., Long Island City 1, N. Y.
Selas Corp. of America, Erie Ave. and D St., Philadelphia 34, Pa.
● Sellers Engineering Co., 4874-76 N. Clark St., Chicago 40, Ill.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.
Semler Co., Jeannette, Pa.
Sensenich Corp., Adjacent to Lancaster Municipal Airport, Lancaster, Pa.
Servel, Inc., Electric Refrigeration Div., 119 Morton Ave., Evansville 20, Ind.
Service To Industry, Box 133, West Hartford, Conn.
Shafer Bearing Corp., 801 Burlington Ave., Downers Grove, Ill.
Shakeproof, Inc., 2501 N. Keeler Ave., Chicago 39, Ill.
Shallcross Co., 48th and Grays Ferry Rd., Philadelphia 43, Pa.
Shallcross Controls, Inc., 2217-21 N. 31st St., Milwaukee 8, Wis.
Shank Co., Cyrus, 625 W. Jackson Blvd., Chicago 6, Ill.
Sharon Steel Corp., Sharon, Pa.
Shaw Co., Benjamin F., Second & Lombard Sts., Wilmington 99, Del.
Shaw-Kendall Engineering Co., 128 S. Superior St., Toledo 4, O.
Shaw-Perkins Mfg. Co., 201 E. Carson St., Pittsburgh 22, Pa.
Sheetlock Co., 4521 N. Clark St., Chicago, Ill.
Sheffler-Gross Co., Drexel Bldg., Philadelphia 6, Pa.
Sherwin-Williams Co., The, 101 Prospect Ave., N. W., Cleveland, O.
Siemon & Co., 1817-19 Holmes St., Kansas City 8, Mo.
Sight Feed Generator Co., P. O. Box 38, West Alexandria, O.
Signal Electric Mfg. Co., Menominee, Mich.
Signal Indicator Co., 894 Broadway, New York 3, N. Y.
Silvercote Products, Inc., 161 E. Erie St., Chicago, 11, Ill.
Simplex Ceiling Corp., 552 W. 52nd St., New York 19, N. Y.
Simplex Heating Specialty Co., Inc., 954 Cabell St., Lynchburg, Va.
Simplex Mfg. Co., 198 N. Main St., Fond du Lac, Wis.
Simplex Oil Heating Corp., 11 Park Pl., New York 7, N. Y.
Sims Co., 18th & Whitley Sts., Erie, Pa.
Sinker-Davis Co., 230 S. Missouri St., Indianapolis 4, Ind.
Sioux Steel Co., P. O. Box 898, Sioux Falls, S. D.
Sipe & Co., James B., Box 8010, Pittsburgh 16, Pa.
Skaneateles Mfg. Co., Inc., 122 Dickerson St., Syracuse 2, N. Y.
● Skidmore Corp., St. Joseph, Mich.
Skilbeck Mfg. Co., 7432 27th Ave., Kenosha, Wis.
Skilsaw, Inc., 5033 Elston Ave., Chicago 30, Ill.
Skinner Co., M. B., South Bend 21, Ind.
Skinner Electric Valve Div., 40 Belden Ave., Norwalk, Conn.
Skinner Engine Co., 337 W. 12th St., Erie, Pa.
Skinner Irrigation Co., 121 E. Canal St., Troy, O.
Skuttle Mfg. Co., 4099 Beaufait, Detroit 7, Mich.
Sly Mfg. Co., W. W., 4700 Train Ave., Cleveland 2, O.
Small Motors, Inc., 2076 Elston Ave., Chicago 14, Ill.
Smith Co., Inc., H. B., The, 64 Main St., Westfield, Mass.
Smith Co., J. B., 3327 B St., Philadelphia 34, Pa.
Smith Co., O. F., Moline, Ill.
Smith Corp., A. O., 3533 N. 27th St., Milwaukee 1, Wis.
Smith Corp., Winfield, H., 144 Eaton St., Springfield, Erie County, N. Y.
Smith & Kanzler Corp., E. Linden Ave., Linden, N. J.
Smith-Raymond Co., 1231-33 Tenth Ave., Columbus, Ga.
Smith & Serrell, Inc., 31 Clinton St., Newark 2, N. J.
Smith Twin Tubular Boiler Co., Inc., Cottman St., at State Rd., Philadelphia 35, Pa.
Smith Welding Equipment Corp., 2633 S. E. Fourth St., Minneapolis 14, Minn.
Smolensky Valve Co., Inc., 940 Broadway, Bedford, O.
Smooth-On Mfg. Co., 568-574 Communipaw Ave., Jersey City 4, N. J.
Snap-on Tools Corp., Kenosha, Wis.
Socony-Vacuum Oil Co., Inc., 26 Broadway, New York 4, N.Y.
Sola Electric Co., 4633 W. 16th St., Chicago, Ill.
Soldering Specialties Co., Summit, N. J.
Solvay Sales Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.
Somers, Inc., H. J., 6063 Wabash Ave., Detroit 8, Mich.
Somerville Iron Wks., Somerville, N. J.
Sonneborn Sons, Inc., L., 88 Lexington Ave., New York 16, N. Y.
Sonner Burner Co., 412-420 E. 6th Ave., Winfield, Kans.
Soreng Mfg. Co., 9555 Eden Ave., Schiller Park, Ill.
● South Bend Air Products, Inc., 304 E. Colfax Ave., South Bend 22, Ind.
South Chester Tube Co., Front & Thurlow Sts., P. O. Box 60, Chester, Pa.
Southbridge Roofing Co., Inc., Hartwell and Chapin St., Southbridge, Mass.
Souther Iron Co., E. E., 1952 Kienlen Ave., St. Louis 20, Mo.
Southern States Iron Roofing Co., Stiles Ave. & Louisville Rd., Savannah, Ga.
Southport Paint Co., Div. Wesson Oil & Snowdrift Co., Inc., Savannah, Ga.
● Spang-Chalfant, Div. of National Supply Co., Grant Bldg., Pittsburgh 30, Pa.
Spartan Tool Co., 1918 Columbia Ave., Chicago 26, Ill.
Special Chemicals Corp., 30 Irving Pl., New York 3, N. Y.
Speedway Mfg. Co., 1834 S. 52nd Ave., Chicago (Cicero), Ill.
● Spence Engineering Co., Inc., 32 Grant St., Walden 6, N. Y.
● Spencer Heater Div., Avco Mfg. Corp., 164 Park St., Williamsport 19, Pa.
Spencer Thermostat Div., Metals & Controls Corp., 34 Forest St., Attleboro, Mass.
Spencer Turbine Co., 486 New Park Ave., Hartford 6, Conn.
Sponge Rubber Products Co., Shelton, Conn.
● Sporlan Valve Co., 7525 Sussex Ave., St. Louis 17, Mo.
Spray Engineering Co., 114 Central St., Somerville 45, Mass.
● Spraying Systems Co., 3219 Randolph St., Bellwood, Ill.
Sprayo-Flake Co., 2715 Irving Park Blvd., Chicago 18, Ill.
Springfield Boiler Co., 1939 E. Capitol Ave., Springfield, Ill.
Sprout-Waldron & Co., Muncy, Pa.
Square D Co., 6060 Rivard St., Detroit 11, Mich.
Square D Co., Industrial Controller Div., 4041 N. Richards St., Milwaukee 12, Wis.
Squires Co., C. E., The, 18502 Syracuse Ave., Cleveland 10, O.
Standard Asbestos Mfg. Co., 860 W. Evergreen Ave., Chicago 22, Ill.
Standard Electric Mfg. Co., West Berlin, N. J.
Standard Engineering Wks., 289 Roosevelt Ave., Pawtucket, R. I.
Standard Fuel Engineering Co., 657 Post Ave., S., Detroit 17, Mich.
Standard Furnace & Supply Co., 413-17 S. Tenth St., Omaha 8, Neb.
Standard Heater & Oil Equipment Co., 245 Cornelison Ave., Jersey City 2, N. J.
Standard Lime & Stone Co., 2004 First National Bank Bldg., Baltimore, Md.
Standard Machine & Mfg. Co., 8213-15 Gravois Ave., St. Louis 23, Mo.
Standard Motor Corp., Elyria, O.
Standard Pressed Steel Co., Box 810, Jenkintown, Pa.
Standard Repeater Corp., 423 W. 126th St., New York 27, N. Y.
Standard Rolling Mills, Inc., 193 Newell St., Brooklyn 22, N. Y.
● Standard Stamping & Perforating Co., 3151 W. 49th Pl., Chicago 32, Ill.
Standard Stoker Co., Inc., Erie, Pa.
Standard Thermometer, Inc., 952 Dorchester Ave., Boston 25, Mass.
Standard Transmission Equipment Co., 78 W. Union St., Pasadena 1, Calif.
Standard Tube Co., 24400 Plymouth Rd., Detroit 28, Mich.
Standard Ventilator Co., Lewisburg, Pa.
Stanley Electric Tools, Div. of The Stanley Works, Myrtle St., New Britain, Conn.
Stanley Works, The, 195 Lake St., New Britain, Conn.
Staples & Pfeiffer, 528 Bryant St., San Francisco 7, Calif.
Sta-Rite Products, Inc., Delavan, Wis.
Star Electric Motor Co., 200 Bloomfield Ave., Bloomfield, N. J.
Star Expansion Bolt Co., 147 Cedar St., New York 6, N. Y.
Star Mfg. Co., Inc., 530 Kinsley Ave., Providence, R. I.
Star Products Co., 130 Walnut Ave., New York 54, N. Y.
Star Tubular Products Co., 4747 S. Richmond St., Chicago, Ill.
Starr Piano Co., Richmond, Ind.
Steam Turbine Div., Worthington Pump & Machinery Corp., Wellsville, N. Y.
Steamaire Co., Cincinnati 2, O.
Stedco Products, 292 Wyoming Ave., Kingston, Pa.
Steel City Electric Co., 1201 Columbus Ave., Pittsburgh, Pa.
Steel Improvement & Forge Co., 974 E. 64th St., Cleveland 14, O.
Steel Products Engineering Co., The, 1205 W. Columbia St., Springfield, O.
● Stemco Corp., Cleveland 16, O.
● Stephens-Adamson Mfg. Co., 47 Ridgeway Ave., Aurora, Ill.

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Sterling Air Conditioning Corp., 519 Bond Bldg., Washington, D. C.
Sterling Electric Motors, Inc., 5401 Anaheim Telegraph Rd., Los Angeles 22, Calif.
Sterling Engineering & Mfg. Corp., 114 Business St., Hyde Park 36, Mass.
● Sterling. Inc., 3744 N. Holton St., Milwaukee 12, Wis.
Sterling Radiator Co., Inc., Westfield, Mass.
Stevens Mfg. Co., Inc., Mansfield, O.
Stewart Ice Machine Co., 1282 W. 1st St., Pomona, Calif.
Stewart Mfg. Co., Inc., 612 Bloomfield Ave., Bloomfield, N. J.
Stewart-Warner Corp., Heating Div., 1514 Drover St., Indianapolis, Ind.
Stic-Klip Mfg. Co., 50 Regent St., Cambridge 40, Mass.
Stickle Steam Specialties Co., 2215 Valley Ave., Indianapolis 1, Ind.
Stillwater Clay Products Co., The, 3334 Prospect Ave., Cleveland 15, O.
Stockham Valves & Fittings Co., 4000 Tenth Ave., N., Birmingham 2, Ala.
Stokes Machine Co., F. J., 5910 Tabor Rd., Philadelphia 20, Pa.
Stokes Molded Products, Inc., Taylor & Webster, Trenton 4, N. J.
Stokol Stoker Co., Inc., Dayton 1, O.
Stout & Sons, David, 7016 Manchester Blvd., St. Louis 17, Mo.
Stow Mfg. Co., 445 State St., Binghamton, N. Y.
Straight Line Foundry & Machine Corp., Direct Separator Div., The, 218 S. Geddes St., Syracuse 4, N. Y.
Strandwitz & Co., Inc., W. J., Jefferson and Master Sts., Camden, N. J.
Stratford Pipe Scalloper Machine Co., 49 Oakland Pl., Stratford, Conn.
Streine Tool & Mfg. Co., New Bremen, O.
● Strong, Carlisle & Hammond Company, 1392 W. Third St., Cleveland 13, O.
Struthers-Dunn, Inc., 150 N. 13th St., Philadelphia 7, Pa.
Struthers Wells Corp., Titusville, Pa.
Stuart Co., W. W., 417 Ninth St., Des Moines 9, Iowa.
Sturtevant Co., P. A., Addison, Ill.
Sudbury Laboratory, South Sudbury, Mass.
Sulflo, Inc., 1143 E. Jersey St., Elizabeth 4, N. J.
Sundstrand Machine Tool Co., Hydraulic Div., 2531 11th St., Rockford. Ill.
Sun-Fire Stoker Corp., New Albany, Ind.
Sun-Ray Burner Mfg. Corp., 139-24 Queens Blvd., Jamaica 2, N. Y.
Super Electric Products Corp., 1057 Summit Ave., Jersey City, N. J.
Super Mfg. Corp., 135 S LaSalle, Chicago 3, Ill.
Super Mold Corp., 402 N. Sacramento St., Lodi, Calif.
● Super Radiator Corp., 6714 Walker St., St. Louis Park, Minneapolis 16, Minn.
● Superior Combustion Industries, Inc., Emmaus, Pa.
Superior Steel Corp., Grant Bldg., Pittsburgh 19, Pa.
Superior Valve and Fittings Co., 1509 W. Liberty Ave., Pittsburgh 26, Pa.
Supersonics Corp. of America, 231 E. 47th St., New York, N. Y.
Supreme Air Filter Co., 126 W. 21st St., New York, N. Y.
Supreme Electric Products Corp., 194 Vassar St., Rochester 7, N. Y.
● Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Sutton Corp, O. A., 1812 W. Second St., Wichita 2, Kan.
Swaby Mfg. Co., 3818 W. Armitage Ave., Chicago 47, Ill.
Swaine Mfg. Co., Fred J., 1300 N. Seventh St., St. Louis 6, Mo.
Swallow Airplane Co., Wichita, Kan.
● Swartwout Co., 18511 Euclid Ave., Cleveland 12, O.
Swett & Co., George E., 256 Mission St., San Francisco, Calif.
Swift Lubricator Co., 19 James Bldg., Elmira, N. Y.
Swift Mfg. Co., Inc., 1455 E. Nine Mile Rd., Hazel Park, Mich.
● Syncromatic Corp., Watertown, Wis.
Synchro-Start Products, Inc., 1046 W. Fullerton Ave., Chicago 14, Ill.
Syntron Co., Homer City, Pa.

T

Taber Pump Co., 272 Elm St., Buffalo 3, N. Y.
Taco Heaters, Inc., 137 South St., Providence, R. I.
Tagliabue Corp., C. J., 614 Frelinghuysen Ave., Newark 5, N. J.
Tal Bender, Inc., 417 N. Water St., Milwaukee 2, Wis.
Tallmadge & Co., Webster, 364 Glenwood Ave., East Orange, N. J.
Tamms Industries, Inc., 228 N. LaSalle St., Chicago 1, Ill.
● Taylor Forge & Pipe Wks., P. O. Box 485, Chicago 90, Ill.
● Taylor Instrument Companies, 95 Ames St., Rochester 1, N. Y.
Taylor Sons Co., Charles, 710 Burns St., Cincinnati 14, O.
Taylor-Winfield Corp., 1052 Mahoning Ave., N. W., Warren, O.
Technical Ply-Woods, 228 N. LaSalle St., Chicago 1, Ill.
Techniflex Corp., Port Jerris, N. Y.
Techtmann Industries, Inc., 714 W. Wisconsin Ave., Milwaukee 1, Wis.
Tecumseh Products Co., Tecumseh, Mich.
Telechron, Inc., Ashland, Mass.
Telsit Insulation Co., 1933 West Farms Rd., Bronx 60, N. Y.
Temp-Control, Inc., 208 State St., Peoria, Ill.
Templeton Bros., 177 Reservation Rd., Hyde Park 36, Mass.
Tempo Products Co., 1900 Euclid Ave., Cleveland 15, O.
Temprite Products Corp., 47 Piquette Ave., Detroit 2, Mich.
● Tennessee Coal, Iron & Railroad Co., United States Steel Corp. Subsidiary, Brown-Marx Bldg., Birmingham 2, Ala.
Tennessee Products and Chemical Corp., American National Bank Bldg., Nashville. Tenn.
Tenney Engineering, Inc., 26 Avenue B, Newark 5, N. J.
Ter-I-Day Sales & Engineering Co., 18426 Grand River, Detroit, Mich.
Terra-Temp Co., Inc., Circle Bldg., Indianapolis 4, Ind.
Terre Haute Boiler Works Co., 1140 Crawford, Terre Haute, Ind.
Terry Steam Turbine Co., The, P. O. Box 1200, Hartford 1, Conn.
Textite Corp., 2110 Roscoe St., Chicago 18, Ill.
Thermac Co., 800 E. 108th St., Los Angeles, Calif.
Thermal Co., Inc., 1434 N. Fourth St., Milwaukee, Wis.
Thermal Industries, Box No. 725, Indio, Calif.
Thermix Corp., The, First National Bank Bldg., Greenwich, Conn.
Thermoid Co., Trenton, N. J.
Thomas Co., Arthur H., W. Washington Square, Philadelphia, Pa.
Thompson & Co., 1085 Allegheny Ave., Oakmont, Pa.
Thompson & Son Co., The Henry G., 277 Chapel St., New Haven, Conn.
Thompson Research & Mfg. Co., Davenport, Fla.
Thomson Electric Welder Co., 161 Pleasant St., Lynn, Mass.
Thomson Industries, Inc., Manhasset, N. Y.
Threadwell Tap & Die Co., Greenfield, Mass.
Three Point Industries, 3767 N. Racine Ave., Chicago 13, Ill.
● Thrush & Co., H. A., Peru, Ind.
Thwing-Albert Instrument Co., Penn and Pulaski Ave., Philadelphia 44, Pa.
Tierney Rotor Ventilator Co., 239 Fourth Ave., S., Minneapolis, Minn.
Tiffin Eaves Trough Clamp Co., 25 Miami, Tiffin, O.
● Tilco-Fin-Tubing Div., David E. Kennedy, Inc., 58 Second Ave., Brooklyn 15, N. Y.
Timken Roller Bearing Co., 1835 Dueber Ave., S. W., Canton 6, O.
Timken Silent Automatic Div., Timken-Detroit Axle Co., Jackson, Mich.
Tinnerman Products, Inc., 2018 Fulton Rd., Cleveland 13, O.
Tippett & Wood, Morris and Warren Sts., Phillipsburg, N. J.
Titeflex, Inc., 469 Frelinghuysen Ave., Newark 5, N. J.
● Titus Mfg. Corp., 113 E. 8th St., Waterloo, Iowa
Titusville Iron Wks. Co., The, Titusville, Pa.
Todd Shipyards Corp., Combustion Equipment Div., 81-16-45th Ave., Elmhurst, L. I., N. Y.
Toledo Pipe Threading Machine Co., 1445 Summit St., Toledo 4, O.
Torit Mfg. Co., 292 Walnut St., St. Paul 2, Minn.
Tork Clock Co., Inc., 1 Grove St., Mt. Vernon, N. Y.
Torq Electric Mfg. Corp., 1006 Interstate St., Bedford, O.
Torrington Co., The, Bantam Bearings Div., South Bend 21, Ind.
Torrington Mfg. Co., 70 Franklin St., Torrington, Conn.
Trade-Wind Motorfans, Inc., 5707 S. Main St., Los Angeles 37, Calif.
Trageser Copper Wks., Inc., 5000 Grand Ave., Maspeth, Long Island, N. Y.
● Trane Co., The, La Crosse, Wis.
Trent, Inc., Leverington Ave. and Wilde St., Philadelphia 27, Pa.
Trent Tube Mfg. Co., 430 Church St., East Troy, Wis.
Trerice Co., H. O., 1420 W. Lafayette Blvd., Detroit 16, Mich.
Triangle Mfg. Co., 396 Division St., Oshkosh, Wis.
Tri-Clover Machine Co., 2809 60th St., Kenosha, Wis.
Trimont Mfg. Co., Div. of Aetna Industrial Corp., 55-71 Amory St., Roxbury, Boston 19, Mass.
Trimount Instrument Co., 37 W. Van Buren St., Chicago 5, Ill.
Trimount Rotary Power Co., 189 Cedar St., Dedham, Mass.
Trindl Products, Ltd., 17 E. 23rd St., Chicago 16, Ill.
Trion, Inc., McKees Rocks, Pa.
Triplex Heating Specialty Co., Inc., 252 N. Grant, Peru, Ind.
Trombetta Solenoid Co., 329 N. Milwaukee St., Milwaukee 2, Wis.
Tropical Paint & Oil Co., 1244-82 W. 70th St., Cleveland 2, O.
Troy Engine & Machine Co., 20 Railroad Ave., Troy, Pa.
Truetite Corp., The, 36 Union Ave., Bridgeport 7, Conn.
Truflo Fan Co., 523 Main St., Harmony, Pa.
Tru-Line Corp., 1725 Clover Field Blvd., Santa Monica, Calif.
Trumbull Electric Mfg. Co., The, Woodford Ave., Plainville, Conn.
Truscon Laboratories, Caniff and Trunk R. R., Detroit 11, Mich.
Truscon Steel Co., 1315 Albert St., Youngstown 1, O.
Tryco Products, Inc., Railroad Sq., Westfield, Mass.
● Tube Turns, Inc., 224 E. Broadway, Louisville 1, Ky.
Tubing Seal-Cap, Inc., 2810 E. 11th St., Los Angeles 23, Calif.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 1, Calif.
Turnbull Mfg. & Dist. Co., 9930 Freeland Ave., Detroit 27, Mich.
Turner Brass Wks., The, 821-47 Park Ave., Sycamore, Ill.
Tuthill Pump Co., 939 E. 95th St., Chicago 19, Ill.
● Tuttle & Bailey, Inc., Corbin Ave., New Britain, Conn.
Tweco Products Co., P. O. Box 666, Wichita 1, Kan.
Twin Disc Clutch Co., 1310 Preston St., Rockford 16, Ill.
● Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., 794 Union St., Brooklyn 15, N. Y.

U

U. S. Electrical Motors, Inc., 200 E. Slauson Ave., Los Angeles 54, Calif.
U. S. Electrical Tool Co., 1050 Findlay St., Cincinnati 14, O.
U. S. Expansion Bolt Co., P. O. Box 827, State St. & P. R. R., York, Pa
U. S. Gutta Percha Paint Co., 43 Dudley St., Providence 1, R. I.
U. S. Machine Corp., Lebanon, Ind.
U. S. Pipe & Mfg. Co., 249 First St., San Francisco 5, Calif.
U. S. Plug & Fitting Co., 305 Frederick Bldg., Cleveland 15, O.
USHCO Mfg. Co., Inc., 135 Tonawanda St., Buffalo 7, N. Y.
Uehling Instrument Co., 473 Getty Ave., Paterson 3, N. J.
Ultrasonic Corp., 61 Rogers St., Cambridge 42, Mass.
Una Welding, Inc., 1615 Collamer Ave., E., Cleveland 10, O.
Unexcelled Mfg. Co., Inc., 350 5th Ave., New York, N. Y.
Unified Air Conditioner Co., Torry Bldg., Duluth, Minn.
Uniflow Mfg. Co., E. Lake Rd., Erie, Pa.
Union Asbestos & Rubber Co., 1821 S. 54th Ave., Cicero 50, Ill.
Union Iron Wks., 1500 Cascade St., Erie, Pa.
Union Malleable Mfg. Co., Ashland, O.
Union Metal Wks., 128 Carter St., Chelsea 50, Mass.
Union Steam Pump Co., Capitol Ave., S. W., Battle Creek, Mich.
Union Water Meter Co., 333 Hermon St., Worcester, Mass.

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● Unistrut Products Co., 1013 W. Washington Blvd., Chicago 7, Ill.
Unit Alarm Co., The, P. O. Box 727, Elizabethton, Tenn.
United Chromium, Inc., 51 E. 42nd St., New York 17, N. Y.
United Cinephone Corp., Torrington, Conn.
● United Conditioning Corp., 74 Varick St., New York 13, N. Y.
● United Cooling Tower Co., 406 W. 34th St., Kansas City, Mo.
United Cork Companies, Central Ave., Kearny, N. J.
United Electric Controls Co., 85 School St., Watertown, Mass.
United Electric Servce Co., P. O. Box 119, Wchita Falls, Tex.
United Metal Hose Co., Inc., 36-01 43rd Ave., Long Island City 1, N. Y.
● United States Air Conditioning Corp., 33rd & Como Ave., S. E., Minneapolis 14, Minn.
United States Gasket Co., 1518 Pierce Ave., Camden, N. J.
United States Gauge Div. of American Machine & Metals, Inc., Sellersville, Pa.
United States Gypsum Co., 300 W. Adams St., Chicago 6, Ill.
United States Mineral Wool Co., South Milwaukee, Wis.
United States Ozone Co. of America, Crescent St., Scottdale, Pa.
United States Pipe & Foundry Co., Burlington, N. J.
United States Radiator Corp., 300 Buhl Bldg., Detroit 31, Mich.
United States Register Co., Burnham St., Battle Creek, Mich.
United States Rubber Co., 1230 Sixth Ave., New York 20, N. Y.
● United States Steel Export Co., New York, N. Y.
● United States Steel Supply Co., 1319 W. Wabansia, Chicago, Ill.
United States Stoneware Co., 60 E. 42nd St., New York 17, N. Y.
Universal Air Filter Corp., 332 W. Michigan St., Duluth 2, Minn.
Universal Convector Corp., 230 Manida St., New York 59, N. Y.
Universal Cooler, Div. of Newport Steel Corp., 299 Joseph St., Marion, O
Universal-Cyclops Steel Corp., Bridgeville, Pa.
Universal Gypsum & Lime Co., 111 W. Washington St., Chicago, Ill.
Universal Welder Corp., 735 Carnegie Ave., Cleveland 15, O.
Uno Ventilator Co., 565 Lincoln Ave., Cliftondale, Mass.
● Up-Right Scaffolds, 1013 Pardee St., Berkeley, Calif.
Utica Products, Inc., Utica 4, N. Y.
Utica Radiator Corp., 2201 Dwyer Ave., Utica 2, N. Y.
Utility Appliance Corp., 4851 S. Alameda St., Los Angeles 11, Calif.
Utility Laboratory, Inc., 330 36th St., Brooklyn 32, N. Y.

V

V-Belt Clutch Co., 418 N. Western Ave., Los Angeles 4, Calif.
V-Mac Industries, 78 Boston St., Guilford, Conn.
Vacuum-Electronic Engineering Co., 316 37th St., Brooklyn 32, N. Y.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Vanderman Mfg. Co., Mansfield Ave., Willimantic, Conn.
Van Dorn Electric Tool Co., Towson 4, Md.
Van Noorden Co., E., 100 Magazine St., Boston 19, Mass.
Vapofier Corp., 10316 S. Throop St., Chicago 43, Ill.
Vapor Heating Corp., 80 E. Jackson Blvd., Chicago 4, Ill.
Vapor Specialty Co., 101 W. 42nd St., New York 18, N. Y.
Ventilating Products Co., 2800 Cottage Grove Ave., Chicago, Ill.
Verson Allsteel Press Co., 93rd & Kenwood Ave., Chicago 19, Ill.
Verson Mfg. Co., Holmes St. at Ledbetter Dr., Dallas 8, Tex.
Vesco Corp., 1381 Sedgwick Ave., New York 52, N. Y.
Vibration Eliminator Co., 10-28 47th Ave., Long Island City 1, N. Y.
Victaulic Co. of America, 30 Rockefeller Plaza, New York 20, N. Y.
Victor Electric Products, Inc., 2950 Robertson Rd., Cincinnati 9, O.
Victor Equipment Co., 844 Folsom St., San Francisco 7, Calif.
Viking Air Conditioning Corp., Perry-Payne Bldg., Cleveland 2, O.
Viking Copper Tube Co., 16700 St. Clair Ave., Cleveland 10, O.
Viking Mfg. Corp., 1747 Chester Ave., Cleveland 14, O.
Viking Pump Co., Fourth and Rouse Sts., Cedar Falls 1, Ia.
Viking Shear Co., 1063 W. 19th St., Erie, Pa.
Vilter Mfg. Co., The, 2148 S. First St., Milwaukee 7, Wis.
Vinco Co., Inc., The, 305 E. 45th St., New York 17, N. Y.
Virginia Smelting Co., West Norfolk, Va.
Vogt Machine Co., Henry, 1000 W. Ormsby St., Louisville 10, Ky.
Voss Co., Inc., J. H. H., 785 E. 144th St., Corner of Wales Ave., New York 54, N. Y.
Vulcan Electric Co., 88-90 Holten St., Danvers, Mass.
● Vulcan Radiator Co., 26 Francis Ave., Hartford 6, Conn.

W

W. G. B. Oil Clarifier, Inc., Kingston, N. Y.
W-H Engineering Co., 4102 S. LaSalle St., Chicago 9, Ill.
Wabash Mfg. Co., 2318 S. Western Ave., Chicago 8, Ill.
Wade Mfg. Co., Elgin, Ill.
Wagner Awning & Mfg. Co., 2658 Scranton Rd., Cleveland, O.
● Wagner Electric Corp., 6370 Plymouth Ave., St. Louis 14, Mo.
Waldron Corp., John, New Brunswick, N. J.
Walker Jamar Co., 365 S. First Ave., E., Duluth, Minn.
Wall Chemicals Div. of The Liquid Carbonic Corp., 3100 S. Kedzie Ave., Chicago 23, Ill.
Wallace Supplies Mfg. Co., 1304-12 Diversey Pkwy., Chicago 14, Ill.
Wallace & Tiernan Co., Inc., P. O. Box 178, Newark 1, N. J.
Walsh Co., The, L. M., 420 Boylston St., Boston 16, Mass.
Walsh-Holyoke Steam Boiler Co., Holyoke, Mass.
Walsh Refractories Corp., 101 Ferry St., St. Louis 7, Mo.
Walton Co., Box 5, Elmwood Branch, Hartford 10, Conn.
Walton Laboratories, Inc., 1186 Grove St., Irvington 11, N. J.
● Walworth Co., 60 E. 42nd St., New York 17, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
● Ward Leonard Electric Co., 24 South St., Mt. Vernon, N. Y.
Warlo Corp., 330 W. 42nd St., New York 18, N. Y.
Warner Lewis Co., 817 N. Lewis Pl., Tulsa, Okla.
Warner Ventilator Co., 225 Spring St., La Grange, Ind.
Warren Foundry & Pipe Corp., 11 Broadway, New York 4, N. Y.
Warren Steam Pump Co., Inc., 300 Bridges Ave., Warren, Mass.
Washburne & Co., E. G., 207 Fulton St., New York, N. Y.
Washington Steel Corp., Griffith Ave., Washington, Pa.
Water Cooling Corp., 71 Nassau St., New York 7, N. Y.
Water Cooling Equipment Corp., New Hampshire Ave. & Weber Rd., Affton Station, St. Louis 23, Mo.
Water Cooling Tower Co., 5501 Cornell Ave., Chicago, Ill.
Water Refining Co., 1123 Barthold, Ft. Wayne, Ind.
Water Service Laboratories, Inc., 423 W. 126th St., New York 27, N. Y.
Water Treatment Company of America, 1159 Hodgkiss St., Pittsburgh 12, Pa.
Waterfilm Boilers, Inc., 154 Ogden Ave., Jersey City 7, N. J.
Watson & McDaniel Co., 440 N. Marshall, Philadelphia 23, Pa.
Watson-Standard Co., 225 Galveston Ave., Pittsburgh 30, Pa.
● Watson-Stillman Co., 140 Aldene Rd., Roselle, N. J.
Watts Regulator Co., 10 Embankment St., Lawrence, Mass.
Waukesha Motor Co., Waukesha, Wis.
Waverly Heating Supply Co., 31 Union St., Boston 8, Mass.
Weatherhead Co., The, 300 E. 131st St., Cleveland 8, O.
Webb Co., The, Webb City, Mo.
Webb Machine & Tool Co., 2901 Grand Ave., Neville Island, Pittsburgh 25, Pa.
Webber Engrg. Corp., 411 Board of Trade Bldg., Indianapolis, Ind.
● Webster & Co., Warren, 1664 Federal St., Camden, N. J.
Webster Electric Co., S. W. Corner Clark & De Koven Aves., Racine, Wis.
● Webster Engineering Co., P. O. Box 2168, Tulsa 1, Okla.
Wedge Protectors, Inc., 3985 Jennings Rd., Cleveland 9, O.
Weil-McLain Co., Michigan City, Ind.
● Weil Pump Co., 1523 N. Fremont St., Chicago 22, Ill.
Weinman Pump Mfg. Co., The, 290 W. Spruce St., Columbus 8, O.
Weirton Steel Co., Weirton, W. Va.
Weiss & Co., H., 113-115 Mercer St., New York, N. Y.
Weksler Thermometer Corp., 52-56 W. Houston St., New York 12, N. Y.
Weldex, Inc., 7326 McDonald Ave., Detroit, Mich.
Welding Apparatus Co., 2750 W. Van Buren St., Chicago, Ill.
● Welding Fittings Corp., Butler Ave. Extension, New Castle, Pa.
Welsbach Corp., The, Kitson Div., 1500 Walnut St., Philadelphia, Pa.
Welsbach Corp., The, Ozone Processes Div., 1500 Walnut St., Philadelphia 2, Pa.
West Coast Electrical Mfg. Co., 10010 S. Main St., Los Angeles 3, Calif.
Western Blower Co., 1800 Airport Way, Seattle 4, Wash.
Western Brass Mills Div. of Olin Industries, Inc., East Alton, Ill.
Western Chemical Co., 713 Washington St., Kansas City 6, Mo.
Western Engineering & Mfg. Co., 1726 E. Washington Blvd., Los Angeles 21, Calif.
Western Felt Works, 4029-4117 Ogden Ave., Chicago 23, Ill.
Western Hanger Co., 55 New Montgomery St., San Francisco, Calif.
Western Lithograph Co., 600 E. 2nd St., Los Angeles 54, Calif.
Western Mineral Products Co., 1720 Madison St., N. E., Minneapolis 13, Minn.
Western Piping & Engineering Co., 119 Kansas St., San Francisco 3, Calif.
Western Precipitation Corp., 1016 W. 9th St., Los Angeles, Calif.
Western Thermal Equipment Co., 1701 W. Slauson Ave., Los Angeles 44, Calif.
Western Wire & Iron Works, Inc., 957 W. 18th Pl., Chicago 8, Ill.
Western Wire Products Co., 1415-35 S. 18th St., St. Louis 4, Mo.
● Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pa.
● Westinghouse Electric Corp., Sturtevant Div., Hyde Park, Boston, Mass.
Weston Electrical Instrument Corp., 619 Frelinghuysen Ave., Newark 5, N. J.
● Wheatland Tube Co., 1300 Bankers Securities Bldg., Philadelphia 7, Pa.
Wheelco Instruments Co., Harrison and Peoria Sts., Chicago 7, Ill.
● Wheeler Mfg. Co., C. H., 1739 Sedgley Ave., Philadelphia 32, Pa.
Wheeling Machine Products Co., Wheeling, W. Va.
Wheeling Steel Corp., Wheeling Steel Corp. Bldg., Wheeling, W. Va.
Whirlaway Motors, Inc., Tipp City, O.
White Flomatic Corp., P. O. Box 267, Hoosick Falls, N. Y.
White Mfg. Co., 2362 University Ave., St. Paul 4, Minn.
● White-Rodgers Electric Co., 1209 Cass Ave., St. Louis 6, Mo.
Whiteley Bearing Corp., 1283 S. Ashland Ave., Chicago, Ill.
Whiting Corp., Harvey, Ill.
Whiting Fire Power Products Corp., 1501 N. First St., Superior, Wis.
● Whitlock Mfg. Co., 44 South St., Hartford 1, Conn.
Whitney Chain & Mfg. Co., The, 237 Hamilton St., Hartford 2, Conn.
Whitney Mfg. Co., W. A., 636 Race St., Rockford, Ill.
Whitney Metal Tool Co., 110 Forbes St., Rockford, Ill.
Whittaker Co., Wm. R., 915 N. Citrus, Los Angeles, Calif.
● Whittington Pump & Engineering Corp., 1126 Prospect, Indianapolis 3, Ind.
Whitty Co., Inc., 86 Western Ave., Boston 34, Mass.
Wickes Boiler Co., 502 N. Water St., Saginaw, Mich.
Wickes Bros., 500 N. Tilden St., Saginaw, Mich.
Wickwire Spencer Steel, Div. of Colorado Fuel & Iron Corp., 361 Delaware Ave., Buffalo 2, N. Y.
Wiedemann Machine Co., 4272 Wissahickon Ave., Philadelphia 32, Pa.
● Wiegand Co., Edwin L., 7610 Thomas Blvd., Pittsburgh 8, Pa.
Wiggins Oil Tool Co., Inc., E. B., 3424 E. Olympic Blvd., Los Angeles 23, Calif.
Wilbur & Williams Co., Greenleaf & Leon Sts., Boston 15, Mass.
Wilcolator Co., 1001 Newark Ave., Elizabeth B, N. J.
Wilhelm Co., A., 3rd and Bern Sts., Reading, Pa.

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Wilkinson Products Co., P. O. Box 1774, Wilshire-La Brea Sta., Los Angeles 36, Calif.
Will Corp., 35 Russell St., Rochester 3, N. Y.
Will-Burt Co., The, Orrville, O.
Williams & Co., J. H., Buffalo 7, N. Y.
Williams Gauge Co., The, 1620 Pennsylvania Ave., N. S., Pittsburgh 12, Pa.
Williams Oil-O-Matic Div., Eureka Williams Corp., 1201 East Bell, Bloomington, Ill.
Williams & Son, I. B., Dover, N. H.
Williams Valve Co., D. T., Div. of The Schaible Co., 1086 Summer St., Cincinnati 4, O.
Williamson Heater Co., 4558 Marburg Ave., Cincinnati 9, O.
Willis Steel Corp., 156 N. Academy St., Galesburg, Ill.
Willson Products, Inc., 348 Thorn St., Reading, Pa.
Will-Weld Mfg. Co., Inc., 1533 Marcy St., Omaha 2, Nebr.
● Wiley & Sons, Inc., John, 440 Fourth Ave., New York, 16, N. Y.
Wiley's Carbide Tool Co., 1340 W. Vernor Highway, Detroit, Mich.
● Wilson & Co., Inc., 4100 S. Ashland Ave., Chicago 9, Ill.
Wilson Co., H. A., The, 105 Chestnut St., Newark, N. J.
Wilson Co., K. R., 215 Main St., Buffalo, N. Y.
Wilson Engineering Corp., 122 S. Michigan Ave., Chicago 3, Ill.
Wilson, Inc., Thomas C., 21-11 44th Ave., Long Island City, N. Y.
Wilson Welder & Metals Co., Inc., 60 E. 42nd St., New York 17, N. Y.
Wind-Way Fan & Ventilator Co., 527 St. Joseph St., New Orleans 13, La.
● Wing Mfg. Co., L. J., 14th St. & 7th Ave., New York 11, N. Y.
Winkler & Sons, Inc., A. E., 2337 N. 31st St., Milwaukee 10, Wis.
Winslow Engineering Co., 4069 Hollis, Oakland 8, Calif.
Wiss & Sons Co., J., 33 Littleton Ave., Newark 7, N. J.
Witte Engine Works, Div. of Oil Well Supply Co., United States Steel Corp., Sub., 1600 Oakland Ave., Kansas City 3, Mo.
Wittenmeier Machinery Co., 850-860 N. Spaulding Ave., Chicago 51, Ill.
Wodack Electric Tool Corp., 4627 W. Huron St., Chicago 44, Ill.
Wolfe-Kote Co., Inc., 820 Penn Ave., Sheboygan, Wis.
Wolverine Tube, Div. of Calumet and Hecla Consolidated Copper Co., 1419 Central Ave., Detroit 9, Mich.
Wood Conversion Co., 1981 First National Bank Bldg., St. Paul 1, Minn.
Wood Mfg. Co., Inc., John, Conshohocken, Pa.
Wood Steel Co., Alan, Conshohocken, Pa.
Wood's Sons Co., T. B., 1275 Fifth Ave., Chambersburg, Pa.
Worner Electronic Devices, Rankin, Ill.
Worthington-Gamon Meter Co., Newark, N. J.
Worthington Pump & Machinery Corp., Dunellen, N. J.
Worthington Pump & Machinery Corp., Harrison & Worthington Sts., Harrison, N. J.
Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
Wright-Austin Co., 3245 Wight St., Detroit 7, Mich.
Wysong & Miles, 625 Fulton St., Greensboro, N. C.

X

X L Refrigerating Co., 1834 W. 59th St., Chicago 36, Ill.
X Laboratories, Inc., 25 W. 45th St., New York 19, N. Y.
X-Pando Corp., 43-15 36th St., Long Island City 1, N. Y.

Y

Yale & Towne Mfg. Co., Stamford, Conn.
Yardley Plastics Co., 138 Parsons Ave., Columbus 15, O.
● Yarnall-Waring Co., 107 Mermaid Ave., Philadelphia 18, Pa.
Yates-American Machine Co., Beloit, Wis.
Yeomans Bros. Co., 1471 N. Dayton St., Chicago 22, Ill.
● York Corp., Roosevelt Ave., York, Pa.
York Corrugating Co., Adams St. & W. M. R. R., York, Pa.
York Electric & Machine Co., 30-34 N. Penn St., York, Pa.
York-Shipley, Inc., York, Pa.
Yost Mfg. Co., Meadville, Pa.
Young & Bertke Co., 1004-1014 Hulbert Ave., Cincinnati 14, O.
● Young Radiator Co., 709 S. Marquette St., Racine, Wis.
Young Regulator Co., 5209 Euclid Ave., Cleveland 3, O.
● Youngstown Sheet & Tube Co., Stambaugh Bldg., Youngstown 1, O.
Yula Water Heaters, Inc., 166 W. 225th St., New York, N. Y.

Z

Zaco Laboratories, Div., Zip Abrasive Co., 1360 W. 9th St., Cleveland, O.
● Zallea Brothers, Taylor and Locust St., Wilmington 99, Del.
Zeh & Hahnemann Co., 182-200 Vanderpool St., Newark 5, N. J.
Zenith Electric Co., 152 W. Walton St., Chicago 10, Ill.
Zimmerman Packing Co., 2768 Highland Ave., Cincinnati 12, O.
● Zink Co., John, P. O. Box 310, Tulsa 1, Okla.
Zone-Heat Regulator Co., Box 188, Garrettsville, O.
● Zonolite Co., 135 S. LaSalle St., Chicago 3, Ill.
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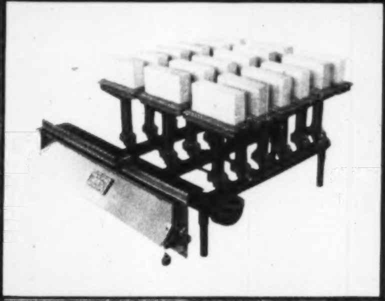
ALL BURNER REQUIREMENTS



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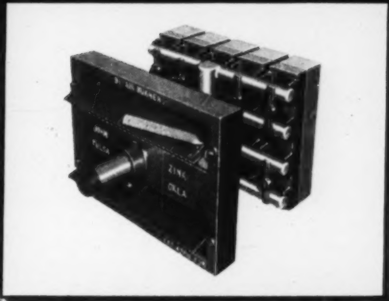

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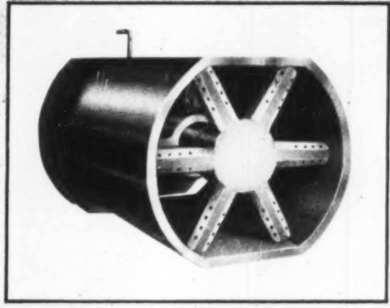

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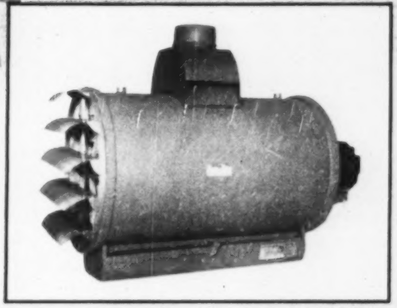

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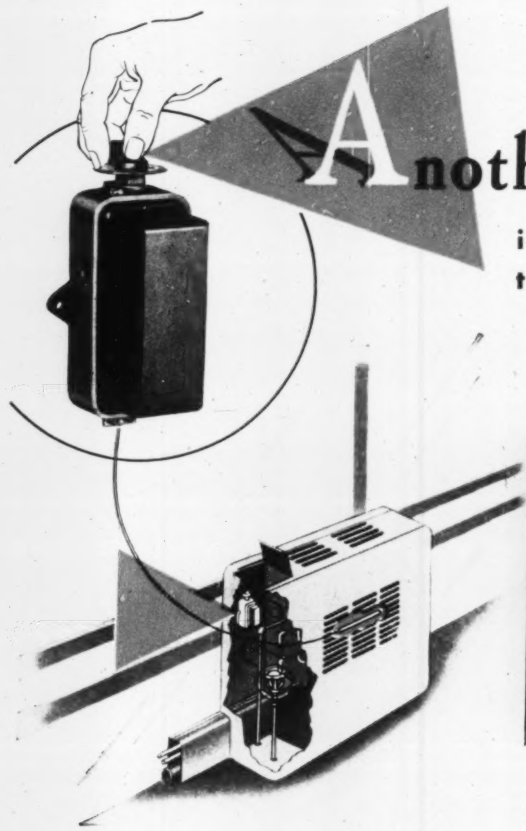

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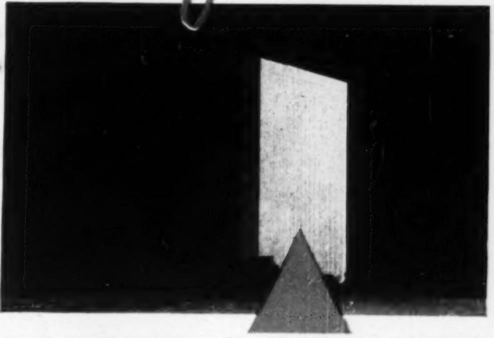

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Architects: Wallace K. Harrison (chairman); Max Abramovitz (deputy); Voorhees, Walker, Foley & Smith; Skidmore, Owings & Merrill; Clark, Rapuano & Holleran.
Mechanical Engineers: Syska & Hennessy, New York, N. Y.
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